MEMOIRS

OF THE

LITERARY

AND

PHILOSOPHICAL SOCIETY

OF MANCHESTER.

Sec I

VOL. III.

WARRINGTON,

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MDCCXC.

1790

ADVERTISEMENT.

THE present volume has been detained an unusual time in the press, partly by the engagements of some of the authors, who have revised their papers for publication; and partly by delays attending the execution of the engravings. The number of materials has likewise rendered this volume larger than either of the former, and consequently lengthened the time of impression.

From the institution of the new class of CORRESPONDING *Members, the Society may expect an extension of communications; while the method of printing to be pursued in future,* by furnishing an early circulation of every essay, among literary men, may induce the* HONORARY *Members, at large, to impart their observations or discoveries still more frequently.*

The Society must repeat the declaration, prefixed to their first volume, that responsibility for the truth of facts, or justness of opinions, to be found in this volume, rests with their respective authors. To encourage scientific exertions is the grand object of the institution; and the Society gladly acknowledges that the public has treated its endeavours with equal indulgence and favour.

* See the Laws annexed.

L A W S.

I. THAT the Ordinary Members only ſhall be inveſted with the privilege of voting and electing Members; and that the whole expences of the Society ſhall devolve upon them.

II. That Gentlemen reſiding at a diſtance from Mancheſter, ſhall be eligible into this Society, under the title of Honorary Members, provided no one be recommended who has not diſtinguiſhed himſelf by his literary or philoſophical publications.

III. That Gentlemen at a diſtance, who have favoured the Society with important communications, or from whom ſuch contributions may be expected, ſhall be eligible, under the title of Correſponding Members.

IV. That every Candidate for admiſſion into the Society, whether as an Ordinary, Honorary or Correſponding Member, ſhall be propoſed by at leaſt three Ordinary Members, who ſhall ſign a certificate of his being, from their knowledge of him, of his character, or his writings, a fit perſon to be admitted into it; which certificate ſhall be read at four ſucceſſive meetings of the Society, previous to the election.

V. That every election ſhall be conducted by ballot, and that the majority of votes ſhall decide, thirteen Members at leaſt being preſent; or a week's previous notice being given, after the fourth reading. That the preſident ſhall have the determining voice, if the number of votes be equal.

VI. That when an Ordinary Member removes to a greater diſtance than twenty miles from Mancheſter, he may be entitled to the continuance of the privileges of the Society, by paying five guineas to the treaſurer, in lieu of his annual ſubſcription.

VII. That a Preſident, four Vice-Preſidents, two Secretaries, a Treaſurer and a Librarian, be elected annually by the majority of Members preſent, on the laſt Friday in the month of April. The election to be determined by ballot.

VIII. That a Committee of Papers ſhall be appointed by ballot, at the ſame time, which ſhall conſiſt of the Preſident, Vice-Preſidents, Secretaries, Treaſurer and Librarian, together with ſix other Members of the Society; and that this Committee ſhall decide by ballot concerning the publication of any Paper which ſhall have been read before the Society; and ſhall ſelect, with the conſent of the author, detached parts of any Paper, the whole of which may not be deemed proper for publication; but that the preſence of ſeven Members of the Committee ſhall be neceſſary for ſuch diſcuſſion or deciſion.

IX. That Viſitors may be introduced by any Member to the meetings of the Society, with the permiſſion of the Chairman.

X. That every Member who ſhall favour the Society with communications, ſhall ſend them to one of the Secretaries, the Monday before the meeting of the Society.

XI. That the Secretary to whom the Paper ſhall be delivered, ſhall, with the approbation of the Preſident, or two Vice Preſidents, have the power of ſuſpending the reading of it until it be referred to a meeting of the Committee of Papers, whoſe deciſion ſhall be final.

XII. That all Papers judged admiſſible ſhall be read by one of the Secretaries, or by the author, in their order.

XIII. That no more than half an hour ſhall be allowed for the reading of any Paper, and if the whole cannot be read within that time, the remainder, except the Society determine otherwiſe, ſhall be deferred till the ſucceeding evening. No Paper however ſhall

ſhall engage more than two evenings, without the conſent of the Society, expreſſed by ballot, if required.

XIV. That authors be requeſted to furniſh the Society with an epitome of their Papers, which may be read at the meeting ſucceeding the reading of each Paper, and the diſcuſſion renewed.

XV. That each Ordinary Member ſhall pay one guinea annually, by half yearly payments, into the hands of the Treaſurer, to defray incidental expences, and to eſtabliſh a fund for the benefit of the Society. Each Member on his election to pay his Subſcription for the current half year, together with one guinea admiſſion fee.

XVI. That no Laws ſhall be enacted, reſcinded or altered, but at the quarterly meetings, on the laſt Fridays in the months of January, April, and October; and that notice ſhall be given, at leaſt fourteen days previous to thoſe meetings.

XVII. That the Society ſhall publiſh a volume of miſcellaneous papers, at leaſt every two years. And that at ſtated times, the Committee ſhall ſelect from the papers which have been read to the Society, ſuch as ſhall appear to be moſt worthy of publication, but that no paper ſhall be publiſhed without the conſent of the author. That every paper, voted for publication by the Committee of Papers, ſhall be ſent to the preſs without delay; that notice of the printing ſhall be given to the author, and that he be entitled to thirty ſeparate copies, on paying the extraordinary expence attending them.

XVIII. That a Library be formed for the uſe of the Members of this Society, and that the Librarian be authorized to purchaſe ſuch books, as ſhall be ordered at the quarterly meetings of the Society; but that no book ſhall be taken out of the Library, without leave of the Librarian, limiting the time of keeping it to ſeven days.

XIX. That the Reſolution to eſtabliſh a Library be announced to the Honorary and Correſponding Members of the Society; and that it be intimated to them by the Secretaries, that donations of their paſt and future publications will be highly acceptable.

XX. That a gold medal ſhall be given to the author of the moſt valuable experimental paper, containing ſome important diſcovery relative to the arts and manufactures of Mancheſter, which ſhall have been delivered to the Secretaries, and read at the ordinary meeting of the Society, before the laſt Friday in March 1791.

XXI. That the adjudication of this premium be referred to the Committee of Papers; that their deciſion ſhall be made by ballot, and that the medal ſhall be delivered by the Preſident to the perſon to whom it ſhall have been adjudged, or to his repreſentative, at the firſt meeting of the Society in October 1791.

XXII. That two ſilver medals ſhall be given annually, one to the author of the beſt Eſſay on a Literary, and another to the beſt on a Philoſophical Subject, which ſhall have been read at the Society during the courſe of the ſeaſon; to be determined by the Committee of Papers.

A

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OF THE

LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER.

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MANCHESTER MARCH 24, 1785.

MAN has a natural right to life, liberty, and property. Life is the gift of God, and held under his diſpoſal and authority: Liberty is eſſential to the perfection of a rational, a moral, and

* This little tract was written for diſcuſſion in the Literary and Philoſophical Society, at a period when taxation was a ſubject peculiarly intereſting to the inhabitants of Mancheſter, on account of a recent duty on the cotton manufactory; which was afterwards repealed, through the candour and wiſdom

and an accountable agent: And property reſults from the exertion of thoſe powers and faculties, which the Deity has beſtowed, which duty calls forth into action, and which are neceſſary to well-being, and even to ſelf-preſervation. Theſe ſeveral rights involve the lawfulneſs of their ſupport, and the guilt of their invaſion. An attack upon his life or liberty will juſtify a man, in the defence of them, even to the deprivation of the life or liberty of his enemy. And the invaſion of his property will warrant his repriſals on the property of the invader. But the ability of an individual would frequently be inadequate to the defence or protection of his rights; nor could he judge, with impartiality, concerning the puniſhment due to the violation of them. In a ſtate of ſociety, therefore, individuals give up to the civil magiſtrate, as their repreſentative, the right of protection and puniſhment. This right becomes a public one, and is to be defended by the collective power, and united expence of the community. From theſe principles flow the duty of allegiance, the authority of laws, and the claims of revenue. To reſiſt the attack of foreign enemies, fleets and

of parliament. It was ballotted for inſertion in a former volume of the Society's Memoirs, but was then withdrawn by the author, and has ſince been reviſed and enlarged. An Appendix is added, at the end of this volume, containing ſupplementary notes and illuſtrations.

armies

armies muſt be provided; to ſupport domeſtic peace, to adminiſter diſtributive juſtice, and to regulate the police of cities and diſtricts, civil officers of various ranks and denominations are to be maintained and remunerated: And conſiderable funds will be required for the encouragement of ſcience, the advancement of arts, and the extenſion of commerce. Thus multiplied and complicated are the juſt and neceſſary charges of government.

The *moral obligation* to pay taxes reſults from the ALLEGIANCE due to the ſovereign power, for the PROTECTION which it affords to life, liberty and property; and for the energy which it exerts in the promotion of order, induſtry, virtue and happineſs.

This obligation is common to the ſubjects of every government; but under the happy conſtitution of Great Britain, where ſubſidies are never claimed by the ſupreme magiſtrate, without the conſent of parliament, we become bound, by a VOLUNTARY COMPACT, made by our delegates, to contribute to the public exigencies, in ſuch proportions, and according to ſuch modes, as they have deliberately enacted.

And, by the refuſal to grant ſuch contributions, or by the evaſion of them, we not only injure the public weal, but, indirectly, INVADE the PROPERTY of our FELLOW-CITIZENS, who muſt bear the bur-

den of additional impoſts, in conſequence of our contumacious exemption.

The validity of theſe ſeveral obligations is equally clear and forcible. And as man is deſtined, by his intellectual powers and moral propenſities, no leſs than by his wants and weakneſſes, for a ſtate of ſociety, the obligations are not merely voluntary, or of *poſitive* inſtitution; but, ſo far as they are eſſential to that ſocial ſtate, originate in the law of nature, which can be deemed no other than the will of God. Yet, though government, in this ſenſe, is of divine authority, it is ſo conſtituted by its adaption to the intereſts and felicity of its ſubjects. The rights of the people, therefore, are not only antecedent to, but included in thoſe of the magiſtrate; and, conſequently, there can never ſubſiſt a legitimate competition between them. Yet the hiſtory of the world is one continued ſeries of ſuch competitions; and experience hath fully evinced, that they have generally ſprung from the arrogance, the ambition and the deſpotiſm of rulers. To vindicate the ſacred and unalienable rights of the people is in reality, to ſubſerve the true ends of government. A good citizen, under every legal, equitable, and well adminiſtered polity, with duty and gratitude, will *render unto Cæſar the things that are Cæſar's:* But the deciſion, concerning the *things that are Cæſar's*, reſts not on the unſtable foundation of arbitrary will; and the appeal may, with confidence, be made

made to the principles of reaſon, of juſtice, and of patriotiſm. On theſe principles, I ſhall endeavor to explain the limits of the ſeveral *moral obligations*, laid down in the three foregoing propoſitions.* (A)

I. ALLEGIANCE is due for the PROTECTION of the ſovereign power. But protection may be paid for at too high a rate. For, in every convention, a juſt proportion ſhould be preſerved, between the price and the value of the commodity. "If, "to purchaſe a ſword for my defence againſt a "thief, I muſt empty my purſe, intereſt will lead "me rather to make a compoſition with the plun-"derer; or prudence will dictate ſome other leſs "chargeable means of ſecurity."† Lord Herbert of Cherbury relates, in his travels through Savoy, that "though the Duke had put extreme taxations "on his people, inſomuch that they paid him "not only a certain ſum for every horſe, cow, ox, "or ſheep that they kept; but afterwards for "every chimney; and, finally, every perſon by "the pole, which amounted to a piſtole or four-"teen ſhillings a head or perſon, yet he wanted "money: At which I did not ſo much wonder, "as at the patience of his ſubjects."‡ After the

* The capitals refer to the notes in the appendix, which is placed at the end of the volume.

† Abbé Raynal.

‡ Life of Lord Herbert.

cruel expulſion of the Moors from Spain, by which that kingdom was deprived of more than half a million of induſtrious inhabitants, new contributions were impoſed on the poor and indolent natives, to ſupply the unavoidable, though unexpected deficiency of the royal revenue, reſulting from that impolitic meaſure. This fertile country has indeed been deſolated by the oppreſſive laws, and rapacious exactions of its government. The number of the people has been reduced, within the ſpace of a few centuries, from twenty to ſeven millions; and the produce of corn, formerly furniſhing, not only a full ſupply for internal conſumption, but alſo a large exportation to other parts of Europe, is now inſufficient for its own diminiſhed population. Every manufacture, and even neceſſary of life, is charged with an impoſt of fourteen *per cent.* on the firſt, which is repeated on each ſubſequent, ſale.* Philip II. attempted to lay the ſame burthenſome duty on his ſubjects in the Netherlands; and the attempt, it is well known, was one principal cauſe of the glorious revolution, which freed the United Provinces from his tyranny.

Protection may be very unduly or unequally diſpenſed; and the ordinary benefits of the ſocial union not participated, in any reaſonable degree, by the bulk of the community. Great lords may

* Lord Kaims.

be

be ſuffered to tyrannize over their tenants or vaſſals; whilſt the country is, at the ſame time, made a priſon to its inhabitants, by the ſevereſt prohibitions of emigration. At the beginning of the ſixteenth century, there ſubſiſted, in Ruſſia, no other ſlaves, except priſoners of war. A new arrangement took place after the conqueſt of Caſan and Aſtracan. Theſe beautiful and fertile provinces ſo powerfully attracted the peaſantry, that a rigorous law enſued, in 1556, which confined them all to their own glebe. And they were thus at once diveſted of property and perſonal liberty. * Similar revolutions have occurred in the other northern ſtates, and the conſequences have been penury, wretchedneſs, and a degradation of the human ſpecies. In France, the tax called the *Taille*, uſed to be levied on men, who, being without any other property than their neceſſary utenſils, and ſubſiſting ſolely on their daily wages, could not be compelled to payment, even by violence itſelf. Every collector, who was conſtrained to undertake the levy of the tax, had authority to call upon the four perſons in the diſtrict, whoſe proportion of the TAILLE was the greateſt, to fill up all deficiencies; and they were thus forced, by the ſale of their effects, or by impriſonment, to expiate the negligence of the collector or the poverty of their neighbors; not-

* Abbé Raynal.

withſtanding they had themſelves diſcharged their own ſhare of the impoſt.* In ſuch caſes, and in others which might be ſpecified, the principles are ſubverted, on which the claim to allegiance is founded: And taxes may then be enforced by penalties, but will no longer be paid from any juſt ſenſe of moral or political duty.

Subſidies may be perverted from their original deſignation, and applied to the purpoſes of ambition, oppreſſion, or the eſtabliſhment of deſpotic power. This occurred in the reign of James II. and occaſioned his expulſion from the kingdom. And in that of Charles I. when ſhip-money was levied under the deluſive and dangerous plea of ſtate-neceſſity, though England then enjoyed a profound peace with all her neighbors, we venerate the intrepid patriotiſm of Hampden, for the noble ſtand he individually made againſt its exaction. Yet the exaction had been laid with great equality; had been ſo generally ſubmitted to by the people, as to produce, in 1636, more than two hundred thouſand pounds; and had been ſolemnly authoriſed by the twelve judges; who, by their ſervile deciſion, to uſe the words of Lord Clarendon, "left no man any thing he might call his own."

II. But it may be alleged that the oppoſition of Hampden was chiefly grounded on the *illegality*

* Life of Turgot by the Marquis de Condorcet.

of

of ſhip-money, as ſubjecting the people to the arbitrary will of the prince; and that A TAX GRANTED BY PARLIAMENT is a ſolemn and VOLUNTARY COMPACT, between the PEOPLE, and their SOVEREIGN, binding the former, in all caſes whatſoever. This poſition implies the lower houſe of parliament to have been legally and conſtitutionally choſen, and not like the packed aſſemblies in the reigns of Richard II. and James II. In the former, the ſheriffs were commanded to ſuffer none to be returned, as knights or burgeſſes, but ſuch as the king's council ſhould nominate.* And, in the latter, the illicit practices employed in election produced complaints from every part of England. Yet ſo ſucceſsful were the arts of the court, that James exulted in there being only forty members, who were not entirely devoted to his intereſt.† Admitting, however, the regular election of our repreſentatives, a little conſideration will evince, that the truſt which is delegated can never be unconditional; and that the powers veſted in them may loſe the force of moral obligation, by palpable abuſe and unrelenting perverſion. Fear, ſelf-intereſt, ignorance, or corruption may predominate in their deliberations, and prevail with them to ſacrifice the deareſt intereſts of thoſe, by whom they are commiſſioned. In the reign of

* Parliamentary Hiſtory. † Burnet.

Henry

Henry VIII. the parliament reſigned both their civil and eccleſiaſtical liberties to the king, and, by one act, totally ſubverted the Engliſh conſtitution. For they gave to the king's proclamations the full force of a legal ſtatute; and even framed the law, as if it were merely declarative, and intended only to explain the true extent of the regal prerogative.* When the ſame arbitrary monarch heard that the commons made a difficulty of granting a certain ſupply, which he required, he was ſo provoked, as to ſend for Edward Montague, a member who had conſiderable influence in the houſe; and laying his hand on the head of that gentleman, then on his knees before him, imperiouſly ſaid, *get my bill paſſed by to-morrow, or to-morrow this head of yours ſhall be off.* His deſpotiſm too well ſucceeded; for, the next day, the bill was paſſed.† Under the government of Edward VI. a grievous and partial tax was impoſed on the whole ſtock and moneyed intereſt in the kingdom, with an *entire exemption of the land.* One ſhilling in the pound was to be levied yearly on every perſon who poſſeſſed ten pounds, or upwards; a ſum equal to half the yearly income of all money-holders, according to the rate of legal intereſt.‡

* Hume, vol. IV. p. 210.

† See Collins's Britiſh Peerage. Hume, vol. IV. p. 51.

‡ Hume, vol. IV. p. 346.

In

In the year 1660 a perpetual exciſe on ale, beer, &c. was enacted, by parliament, as a *commutation* with Charles II. for the abolition of the court of wards and liveries. This court was an intolerable oppreſſion on the nobility and gentry; as the king exerciſed by it the wardſhip of all infant heirs; and enjoyed the benefit of their eſtates, till they had attained a legal majority. He had, alſo, the abſolute diſpoſal both of male and female heirs in marriage, with other powers liable to great abuſe. But it is evident that theſe feudal ſervices affected ſolely the proprietors of land; whereas the exciſe muſt fall chiefly on the lower tenantry, and laboring poor; and that, therefore, the alleged commutation was, in a conſiderable degree, founded in fraud and injuſtice. In this light it appeared to ſome of the members of the houſe of commons: Mr. Anneſley, in particular, urged, "that if the bill "was carried (which it was afterwards by a majority "of two voices only) every man who earns his bread "by the ſweat of his brow muſt pay exciſe, to excuſe "the court of wards, which would be a greater "grievance upon all, than the court of wards was "to a few."*

There is on record a ſolemn reſolution, which paſſed in a committee of the houſe of commons April 6, 1780, when no leſs than four hundred

* See Harris's Life of Charles II. vol. I. p. 396. Parliamentary Hiſtory, vol. XXIII. p. 21.

and

and forty-eight members were preſent, that the influence of the crown *hath increaſed, is increaſing, and ought to be diminiſhed.* (B) And in the ſtatute of a ſubſequent ſeſſion of parliament, for regulating the king's houſehold, it is enacted, that an oath be taken by the keeper of his majeſty's privy purſe, that no part of it ſhall be applied to the uſe of any member of the houſe of commons. We are further warranted, in our apprehenſions of the danger ariſing from this ſource, by the authority of the Baron de Monteſquieu, who predicts that the liberties of England will periſh, whenever the legiſlative power ſhall have become more corrupt than the executive: or, as it ſhould, perhaps, have been expreſſed, whenever the executive power ſhall have acquired a corrupt aſcendency over the legiſlative. In the reign of Charles II. if the diſpatches of Barillon may be credited, the king of France meditated the eſtabliſhment of a pecuniary influence in the Engliſh Parliament. It is alſo well known that Charles was himſelf a penſioner to this monarch, and received large ſums for the moſt illicit purpoſes. When the crown egregiouſly abuſes its power, the commons, on various occaſions, have thought themſelves juſtifiable in withholding the ſupplies. If they, however, unhappily countenance and aid ſuch abuſes, and remain deaf to petitions, remonſtrances, and every other conſtitutional claim, the people may continue to ſubmit, but cannot deem themſelves

morally

morally bound by their acts: And Britons would then loſe the glory, which Plato aſcribed to the citizens of Athens, of being at once the maſters and ſlaves of the laws.

The diviſion of the ſovereignty of theſe realms into three eſtates, which, acting in concert, we denominate parliament, by reciprocal checks, and reciprocal aids, gives our civil polity advantages enjoyed by no other in Europe. Yet it was an apopthegm of the great Lord Treaſurer Burleigh that England could never be ruined but by a parliament.* And the doctrine of its omnipotence, which ſucceeded that of the divine and indefeaſible right of our kings, has contributed to the loſs of America, as well as to the ſeparation of Ireland; and may, hereafter, prove ſubverſive of our liberties. For with the ſpecious obſervance of every form of our conſtitution, the eſſence of it may be annihilated; as occurred at Rome, under the deſpotiſm of Auguſtus: For the ſenate retained themſelves the image of freedom, whilſt they gave a full ſanction to his uſurpation. Indeed corporate bodies, when they affect unlimited power, are capable of proceeding to greater lengths than any individual.

Supreme authority is perfectly diſtinct from arbitrary or abſolute power. The one is founded on certain fundamental principles, and limited by

* Blackſtone.

certain

certain conſtitutional reſtrictions; whilſt the other is unconditional, and without all rational control. A juſt government is obliged to the moſt ſcrupulous attention to the original ends of its inſtitution. Nor can even wiſe and legitimate *ends* be purſued by *means* inconſiſtent with equity, becauſe no policy can ever ſuperſede the laws of morality. And this rather dignifies, than derogates from, ſovereign dominion. For the Deity himſelf is bounded, in the exerciſe of power, not only by phyſical impoſſibilities, but by the rectitude of his divine nature.

Compulſion has been ſaid to be the eſſence of government.* But, I apprehend, *compulſion* is here miſtaken for *a power to compel*; otherwiſe, there can be no diſtinction between government and tyranny. The former is inſtituted for the public weal, and, when ſo adminiſtered as to promote its ſalutary ends, will have the confidence, the reſpect, and the *voluntary* obedience of a great majority of its members. Whereas the latter, according to a recent definition of eaſtern deſpotiſm, regards "the ſovereign as poſſeſſed of *all*, and the people of *no* rights." It exacts what a wiſe man cannot freely give, and commands what a good man ought not to perform. "The ſtate "of every king," ſays the preamble to one of our acts of parliament, "conſiſts more aſſuredly

* Soame Jenyns.

"in

" in the love of the ſubjects towards their prince, " than in the dread of laws made with rigorous " pains."* But the love of the ſubject can alone be ſecured by a full conviction that the ſupreme magiſtracy is cordially intereſted in his proſperity and happineſs. And this is beſt evinced by a reluctance to impoſe unneceſſary burthens; by equity and impartiality in the aſſeſſment and collection of them, and by a readineſs to participate in the ſacrifice of private intereſt to public good. The Roman emperor, Marcus Aurelius, ſold the furniture of the imperial palace, together with his own veſtments, and thoſe of the empreſs, rather than levy a new tax on the people!†

III. In ſupport of the moral obligation to pay taxes, it is juſtly urged, that by our refuſal to grant ſuch contributions, we not only injure the commonwealth, but caſt upon others that debt, which we ought to diſcharge ourſelves. A venerable philoſopher has, in a very appoſite manner, illuſtrated this argument, by the following analogy. " What ſhould we think of a com- " panion, who having ſupped with his friends at " a tavern, and partaken equally of the joys of " the evening with the reſt of us, would never- " theleſs contrive, by ſome artifice, to ſhift his

* See Blackſtone's Commentaries, vol. IV. p. 17.

† Aul. Gell.

" ſhare

" ſhare of the reckoning upon others, to go ſcot " free? If a man, who practiſed this, would, " when detected, be deemed and called a ſcoun- " drel, what ought he to be called, who can " enjoy all the ineſtimable benefits of public " ſociety, and yet contrive to evade paying his " juſt ſhare of the expence, and wrongfully throw " it upon his honeſter, and, perhaps, poorer " neighbors?"* But ſuppoſe the ſhare to be unjuſt, or partially demanded; is the impoſition to be ſubmitted to without complaint or remonſtrance? The plea of equity, which authorizes one to withhold a public ſubſidy, if well founded, muſt be clearly diſcernible by the underſtanding of his neighbor, and ought alike to direct his conduct. Should he, therefore, through the want of patriotiſm, or the fear of penalty, acquieſce in oppreſſion, he deſervedly incurs both the blame and the ſuffering. Mr. Hampden withſtood the aſſeſſment of ſhip-money, in oppoſition to the unanimous opinion of the twelve judges; and in vindication of the unalienable rights of his fellow-ſubjects, expoſed himſelf, for the trifling ſum of twenty ſhillings, to the indignation, and rigorous perſecution of the court.

I am ſenſible that pride, reſentment, faction, and ſelf-intereſt ſet themſelves in oppoſition to the ſtate; and, that men, ſo actuated, may falſely

* Franklin's Political and Miſcellaneous Pieces, p. 69.

aſſume

aſſume the motives and principles of the conſcientious and the good. Penalties, therefore, are wiſely annexed to the infringement of the laws of revenue: And authority is properly exerted in the ordinary courſe of government, to awe the refractory into ſubmiſſion. But it muſt ſtill reſt with the people, ultimately, to decide concerning the moral force of that obligation to pay any particular tax, which is antecedent to the penalty incurred by diſobedience; becauſe ſuch deciſion can be referred to no other tribunal, without the moſt egregious ſoleciſm. And, where can the caſe be ſhewn, in which the judgment and determination of the many hath not received its commencement in the judgment and determination of the few, and even of an individual? The right, therefore, muſt be admitted to ſubſiſt in both; though the exerciſe of it can only be juſtified on extraordinary occaſions. (c) Nor can danger be apprehended to a well governed ſociety from this doctrine. For oppreſſion muſt be manifeſt and heavy, before it will be generally reſiſted; and partial offences, unſupported by public opinion, will be readily prevented by a vigilant police, or compenſated by pecuniary mulcts. The refuſal of Mr. Townſend, a very reſpectable magiſtrate in London, to pay his aſſeſſment to the land-tax, is within the memory of every gentleman preſent. He grounded this refuſal on the arbitrary proceedings of the

houſe of commons, relative to the Middleſex election; and the conſequent illegality of an impoſition, levied on a county in which the people were not duly repreſented. His conduct, on this occaſion, was influenced by no ſordid motives, and proceeded ſolely from a patriotic zeal to ſecure the rights of election. Yet a jury of Middleſex men gave a verdict againſt him, without ſcruple or heſitation. And their deciſion was reaſonable and proper, becauſe the bonds of the ſtate are not to be raſhly looſened by every temporary error or miſconduct of ſtateſmen. Candid allowances will and ought to be made for the paſſions, prejudices, and imperfections incident to our governors, provided their general conduct evinces wiſdom and rectitude. Indeed there is ſo much veneration for power, ſo great a fear of preſent ſuffering, and ſuch habitual regard to the forms of civil juriſdiction in the bulk of the people, that maxims of paſſive obedience are not neceſſary to their ſubjection; whilſt they are highly injurious to their rulers; of which the hiſtory of the Stuarts affords the fulleſt evidence. (D) For the temptations to abuſe power are, at all times, greater than thoſe of oppoſition to it; and the abuſe is attended with more permanent evils to ſociety. An equitable and well eſtabliſhed legiſlature can, therefore, be under no neceſſity of inflicting heavy penalties on breaches of the laws of revenue;

revenue; and punishments of a different nature are seldom, if ever, to be justified. We read, with horror, that in the empire of Japan, death is inflicted on the smuggler. And our sentiments of equity and humanity are almost equally shocked with the account given by M. Necker, that more than three hundred men, of the province of Bretagne alone, are annually consigned to slavery in the gallies of France, for carrying on an illicit commerce in the two articles of salt and tobacco. The truth is, this political crime makes little impression on the moral feelings of the mind, till its nature, extent and consequences have been examined and recognized by reason. And to such investigation the generality of men have neither leisure nor ability to apply themselves. Turpitude in human actions is marked either by the gross defect of good principles, or the prevalence of bad ones. Fraud, dishonesty, perfidy, and cruelty necessarily involve in them a consciousness of guilt; and, therefore, indicate a mind devoid of rectitude, or overborne by the predominance of malignant passions. But the retention of what is the acknowledged property of the individual, before it is claimed by the state, though, at all times culpable, and deserving of punishment, in ordinary cases, when the nature of the obligation is not sufficiently understood, implies no high degree of criminality.

lity.* And he, who avails himſelf, without the ſcruples which he ought to feel, of the careleſneſs or miſtake of a tax-gatherer, to evade the proportional payment exacted from his neighbors, would bluſh to take advantage of the tradeſman, who, by ſimilar careleſneſs or miſtake, hath omitted, in his bill, ſome part of the debt which is owing to him. But, when invaſion threatens a country, or public calamity calls forth the exertions of every member of the ſtate, the ſentiments of the mind being reverſed, breach of allegiance, under ſuch circumſtances, would be deemed almoſt equal to the crime of parricide. We may illuſtrate this obſervation by a caſe in military ſervice, with reſpect to our feelings, ſomewhat parallel. No one, but the officer on guard, would puniſh the *ſleeping centinel* with ſeverity, during the ſeaſon of peace. But, on ſome critical and very important conjuncture, in time of war, the ſame offence would merit death, in the eſtimation of the moſt humane ſpectator. To eſtabliſh a ſcale of crimes, with exact preciſion, ſo as to aſſign to each its due degree of puniſhment, is beyond the extent of human ability; and can be accompliſhed only by the omniſcient Searcher of hearts. But the penal

* On this ſubject conſult Monteſquieu, Beccaria, Blackſtone, Lord Kaims, Dr. Adam Smith, &c.

laws

laws of government ſhould be founded on a like diſcrimination, ſo far as it is practicable, clear, and obvious; and, in all doubtful caſes, ſhould incline more to mildneſs than ſeverity. For it is juſtly obſerved, in the preamble of the ſtatute before referred to, "that laws, made for the preſervation "of the commonwealth, without great penalties, "are more often obeyed and kept, than laws made "with extreme puniſhments."

I have thus endeavored, with great brevity, to trace the origin, to explain the principles, and to determine the extent of a duty, which, though eſſential to the being of ſociety, and of equal importance to the governors and governed, in every community, has not hitherto, I believe, received a ſpecific denomination in any language. Nothing tends more to the eſtabliſhment of juſt authority, than the free and temperate inveſtigation of the reaſons on which it is founded. And, from what has been advanced, I preſume, it may be inferred, that a *tax* can be of no *moral obligation*, when the claim to allegiance is abſolutely forfeited; that it is of *imperfect* obligation from mere general allegiance; and that, to give it *full* and *complete* validity, it ſhould be A LEVY MADE ON THE COMMUNITY, BY LAWFUL AUTHORITY; ACCORDING TO PRESCRIBED FORMS; IN AN EQUITABLE MODE AND PROPORTION; and FOR THE PUBLIC WEAL.

In Britain, the LAWFUL AUTHORITY, competent to impoſe a ſubſidy, can only be that of the king, lords, and commons, in parliament aſſembled. The king is repreſentative of the majeſty of the people; from them he derives his dignity; to their deputies, his miniſters and counſellors are amenable; and his prerogatives * conſiſt only in a diſcretionary power of doing good. And, if the regal office be a delegation, the peerage, which flows from it, muſt participate of its nature. The three eſtates, therefore, though in different modes of truſt, ſeverally and collectively, act in behalf of, and are virtually reſponſible to the community; who poſſeſs, and frequently exerciſe, towards each of them, the right of petition and remonſtrance. But much circumſpection is required in applying practically the ideas of REPRESENTATION to the regal and ariſtocratical branches of our conſtitution. Theſe indeed are delegates, but in a qualified ſenſe; and ſhould be reſorted to only, in this view, on preſſing emergencies. For the commons are the deputed guardians of the people's rights; commiſſioned, by them, to act according to, and to expreſs their united ſuffrage; and renewing their truſt and accountableneſs, on every ſucceſſive election. It is derogatory, therefore, of their importance and dignity, and

* Locke, Blackſtone.

muſt

muſt tend to diminiſh their due weight in the ſcale of government, to transfer the peculiar functions with which they are inveſted to the peers, or to the throne. (E)

Of the FORMS preſcribed in paſſing a money bill, the moſt eſſential to its moral validity, becauſe moſt intereſting to the liberty of the ſubject, is, that it ſhould originate ſolely in the houſe of commons. For the lords, being a permanent, hereditary body, created at pleaſure by the king, are ſuppoſed to be more liable to be influenced by the crown; and, when once influenced, to continue ſo, than the commons, who are freely elected, and only for a limited time, by the people.* This privilege forms the great conſtitutional check on the executive branch of adminiſtration, and every good citizen ſhould watch over it with unremitting and jealous attention; extending his diligent and patriotic obſervation even to turnpikes, pariſh-rates, and impoſts collected, not for the exigencies of government alone, but for private and local benefit.

TO APPORTION the taxes, with all poſſible IMPARTIALITY, is eſſential to their having the full force of moral obligation. Yet this is the moſt arduous office of the financier; and, when a kingdom is under the preſſure of accumulated

* Blackſtone.

debts, can, perhaps, be accompliſhed only by ſuch a modification of the whole ſyſtem of revenue, as ſhall compenſate the unavoidable exceſſes in ſome caſes, by equitable exemptions in others. Impoſts on articles of proviſion have often been ſo improvidently laid, as to occaſion great diſtreſs amongſt the poor. And, as they are the chief conſumers, becauſe the moſt numerous order of the ſtate, the diſproportion, attending ſuch exactions, is an injuſtice equal to the cruelty of the exactions themſelves. "Previous to all the laws "of ſociety, man had a right to ſubſiſt. And "is he to loſe that right by the eſtabliſhment of "laws? To ſell the produce of the earth to the "people, at an exorbitant price, is, in reality, to "deprive them of it. To wreſt from them, by "a tax, the natural means of preſerving life, is "to affect the very principle of their exiſtence."* But I would not be underſtood to object to the impoſition of moderate duties on the neceſſaries of life. When judiciouſly planned, and gradually laid on articles which are cheap and plentiful, they promote induſtry, ingenuity and ſobriety; and are paid cheerfully, becauſe imperceptibly, as they are confounded with the value of the commodity itſelf. (F) During the impoſts of the Sforzas on the harveſts and markets of the Piedmonteſe, the ſkill

* Abbé Raynal.

and

and enterprising spirit of that people were roused to the highest exertion; and their fabrics of silk and cotton were then worked with such elegance and expedition, by the invention of machinery, as precluded all competition. The gentlemen engaged in the manufactures of Manchester will find these observations perfectly consonant to their own experience; yet they are of dangerous tendency, and admissible only within certain restrictions. For both art and activity are not only bounded in their extent, but are precarious in their duration, and dependent on a variety of unforeseen contingencies. And, though the moderate pressure of wants, which may be gratified without much difficulty, stimulates to exertion; yet, necessity creates despair, the parent of idleness, profligacy, and misery. Under such circumstances, the productive laborers of the state will be considerably diminished in number, and will be compelled to raise the price of industry to a height subversive both of trade and commerce. It must be remembered, also, that these working members are incident to the severity of seasons, as well as to the fluctuation and instability of those manual arts which depend on fashion, local conveniencies, or foreign materials; and that they are often plunged into sufferings which call for public aid, and ought to supersede exaction. Besides, there is at all times, and in every place a numerous class of poor, who,

who, from a want of ſkill, of health, and of that energy which originates from the united powers of nature and education, are barely qualified to earn, from day to day, a ſcanty ſubſiſtence. Yet theſe are, equally with ourſelves, the commoners of the earth; and have a juſt claim to ſome portion of the good things of life. May we not alſo add, that there muſt be *hewers of wood* and *drawers of water*; and, that to execute the meaneſt and moſt ſubordinate offices is eſſential to complete the aggregate of human induſtry and happineſs. A wiſe polity, therefore, will not, by a rigid ſyſtem of finance, promote the extinction of ſuch men, but will treat them with proper indulgence, will encourage their marriages, and, by well planned inſtitutions, render their poſterity virtuous, active, and uſeful citizens. The penury and depopulation of Spain have been proved, by Uſtariz, to ariſe, not from emigrations to America and the Weſt Indies, but from the oppreſſive laws of revenue which prevail in that country. When Lord Moleſworth reſided in Denmark, the collectors of the poll-tax were obliged to accept of old feather-beds and other neceſſaries, inſtead of money, from the inhabitants of a town, which once raiſed 200,000 rix-dollars for Chriſtian IV. on twenty-four hours' notice. In Holland, manufactures have long been in a declining ſtate. It has been calculated, that one third of every man's income

come is paid in ſubſidies. Bread, I am informed, is taxed at from twelve to fifteen *per cent.* and in towns much higher; malt liquor at fifteen *per cent.* and butchers' meat at twenty *per cent.* Nothing could counteract ſuch heavy duties, on the lower orders of the people, but the extreme frugality and perſevering induſtry, which characterize the inhabitants of the United Provinces.

The EQUITY of an impoſt; and, conſequently, its moral validity, is very materially affected by the MODE of ASSESSMENT. For the time expended, the vexation occaſioned, and the indignity ſuſtained by it may be equivalent to a manifold, and, therefore, diſproportional payment. Hearth-money, which was granted to Charles II. his heirs and ſucceſſors, for ever, was abrogated, in the year 1688, by an act of William and Mary; of which the following is the preamble, "That it "it is not only a great oppreſſion upon the poorer "ſort, but a badge of ſlavery upon the whole peo- "ple; expoſing every man's houſe to be entered "into, and ſearched, at pleaſure, by perſons un- "known to him."* The exciſe, from its firſt inſtitution to the preſent time, has been odious to the people of England. It extends to a very numerous detail of commodities, the liſt of which, ſays Sir William Blackſtone, no friend to his

* Lord Kaims's Sketches, vol. II. p. 354.

country

country would wiſh to ſee farther increaſed. Yet it has been greatly increaſed ſince the time of this excellent judge, and, I believe, with additional vexations and ſeverities. The officers, concerned in this branch of revenue, are authorized to enter and to ſearch the houſes of perſons, who deal in exciſeable articles, at all hours of the day, and in many caſes, of the night alſo. And the proceedings, under ſuſpicion of tranſgreſſion, are ſo ſummary and ſudden, that, in a very ſhort ſpace of time, a man may be convicted in the penalty of many thouſand pounds, by two commiſſioners, or juſtices of the peace, or even by the ſame number of magiſtrates, in the ſmalleſt corporate town, to the total excluſion of the trial by jury, and without regard to the common law of the land.*

This mode of aſſeſſment might, perhaps, be rendered more conſonant to the principles of Britiſh liberty, and to the ordinary proceedings of legal adminiſtration. There ſeems to be no ſufficient reaſon for the excluſion of a jury, nor for deciding in a way ſo unuſually ſudden and ſummary. Appeals, alſo, ſhould be admiſſible, in all caſes, to the quarter ſeſſions, or to ſome public and reſpectable tribunal. And the perſons proſecuted ſhould be allowed counſel for their defence, together with full coſts of ſuit, and even damages, if judgment

* See Blackſtone, Burn's Juſtice of the Peace, &c.

be

be awarded in their favor. Nor does it ſeem equitable, provided no perjury has been practiſed, nor malignant intention manifeſted, that, when the plaintiff is non-ſuited, the officer of revenue ſhould recover treble coſts. Theſe alterations in the ſtatutes of exciſe would not occaſion any delay, of conſequence, to the revenue; and they might obviate abuſes, which, by creating murmurs and diſcontent, diminiſh the veneration due to the laws. (G)

In the Highlands of Scotland, it is ſaid by Lord Kaims, that the exciſe upon ale and ſpirits defrays not the ſalaries of the officers, who levy it. The people, therefore, are burthened with a contribution, which adds to the expence of government, and withdraws from uſeful labor many induſtrious hands. This laſt conſideration ſeldom enters into the eſtimate of the financier: Yet the magnitude of it will be apparent from the late obſervations of M. Necker, who computes that the tax-gatherers in France amount to two hundred and fifty thouſand perſons; thirty-five thouſand of whom devote their whole time to the buſineſs. The enforcement of impoſts by oaths may be ſuppoſed rather to increaſe, than to diminiſh their moral validity. Yet it is a practice that, on trivial occaſions, ſeems to participate of impiety; and, on all occaſions, is conducted with ſo much careleſneſs and irreverence, as tends to the moſt pernicious conſequences. A million

of

of perjuries are ſuppoſed, by a very able calculator, to be annually committed in this kingdom.* (H)

In the definition of a tax, which has the full force of a moral obligation, it has been laid down, as its ultimate and moſt important conſtituent, that it is a levy made for the PUBLIC GOOD. And it is the ſpecial duty of the ſupreme power to keep this ſacred end in view, in the exaction of every ſubſidy. The confidence and veneration of the people would thus be ſecured; and a reſpectful ſubmiſſion would be paid even to the errors of government, as unavoidable conſequences of human frailty; and as only temporary grievances, which better information would redreſs. In the application alſo of the national funds, the like rigid attention to wiſdom and rectitude ſhould be uniformly maintained. How often has it been urged to me, ſays M. Necker, can you refuſe to aſk the king for a thouſand crowns, to relieve ſuch a perſon whoſe misfortunes are known to you. Will the royal exchequer be the poorer for it? Forget, I have replied, this royal exchequer, which you conſider only as an accumulated maſs of money, without having examined its ſource: A thouſand crowns are the amount of the land-tax of two villages; and I leave you to judge whether the perſon for whom you ſolicit has a juſt claim to the labor and contributions of their inhabitants.

* Price on the American revolution, p. 82.

It

It is a violation (obſerves the ſame honeſt financier, in another part of his work, with which I ſhall now conclude)—It is a violation of the moſt ſacred of all depoſits, to employ the ſacrifices of a whole nation in inconſiderate prodigalities, uſeleſs expences, and undertakings foreign to the good of the ſtate.

N. B. *The enlargement of this eſſay, has occaſioned ſupernumerary pages, which the printer has diſtinguiſhed by crotchets. An Appendix, containing notes and illuſtrations, is inſerted at the end of the volume.*

Of POPULAR ILLUSIONS, *and particularly of* MEDICAL DEMONOLOGY. *By* JOHN FERRIAR, M.D.

The earth has bubbles, as the water has,
And theſe are of them.
SHAKESPEARE.

READ MAY 12, 1786.

THERE are two claſſes of readers, who will probably expect little entertainment from the ſubject of this eſſay; thoſe who are not acquainted with it as a branch of literature, will think it an idle taſk

taſk to attack the forgotten follies of the nurſery; thoſe who know the number, the ingenuity and importance of writers in this controverſy, may ſuppoſe that little can be added to their labours. To the firſt I acknowledge, that we ſhould hardly expect that extravagant conceptions, frequently originating in the imbecility of obſcure and frantic individuals, ſhould intereſt political as well as literary bodies, ſhould be defended and ſupported with the moſt turbulent clamours, and ſhould ſometimes endanger the ſafety and order of ſociety; yet ſuch have been the effects of popular illuſions; ſome of them indeed ſo extraordinary, that nothing but the occurrence of ſimilar events in our own times could gain them belief. Theſe facts conſtitute a curious part of the hiſtory of human reaſon, and every where obtrude themſelves in medical reſearches, yet I believe the ſubject is in general miſapprehended, and errors are imputed to ignorance, which, however they aroſe, were ſupported in the moſt enlightened times, and by writers of the greateſt knowledge and acuteneſs. A proper attention to ſome facts ſeparated from the great maſs (for I dare not undertake a complete hiſtory) will convince us, that ſuch infatuations are not always to be aſcribed to the occaſional workings of diſtempered minds, but to the general perſuaſion of the moſt intelligent; and that they derive their origin from the abuſe of tendencies imparted for better purpoſes.

Ignorance

Ignorance and fear are generally ſaid to produce the firſt ſuperſtitions of uncivilized men; and they indeed aſſiſt each other powerfully. The mind ſeems to magnify the object of its terror in proportion to its ignorance of the properties of that object. But a cauſe equally active with theſe, which operates both in the rude and poliſhed ſtates of ſociety, is the reſtleſs curioſity we derive from our conſtitution reſpecting the cauſes of natural phænomena. Man, in the ſavage ſtate, is melancholy and reſerved; conſtantly expoſed to toils, and frequently to dangers, he aſſociates the ideas of hoſtility or protection even with inanimate objects; unacquainted with the relations of cauſe and effect, he judges chiefly from thoſe of reſemblance; every ſtorm is ſuppoſed to be directed by an enemy, ſimilar to the human adverſary, but ſuperior both in powers of oppoſition and concealment: the rock, or the tree which ſhelters him from the weather, or ſaves him from the purſuit of a wild beaſt, becomes firſt a patron, and then a divinity. Accordingly, the deluſion of incantation was long ſupported in Germany, becauſe the peaſants could not account for the appearance of hail-ſtorms in ſummer, but from the operations of witches*; and the deification of ancient heroes and legiſlators can only be explained on the principles of gratitude and veneration, which led their people to hope that their benefactors continued to

* Wier. Lib. Apologet.

behold

behold and protect them, after death, though heightened in their powers, and changed in their mode of exiſtence. In certain ſtates of man, reſpect and adoration are ſimultaneous; the Egyptians worſhipped different animals and vegetables; the Athenians conſidered the poſts before their houſes as gods*; the Romans deified their military ſtandards†, and erected a temple for their reception at every permanent ſtation(A). Shakeſpeare touches this diſpoſition finely, when Caliban worſhips the perſon who firſt gives him a draught of wine;

> I'll ſhew thee ev'ry fertile inch o' the iſle,
> And I will kiſs thy foot: I pri'thee be my god.

It is remarkable, that the propenſity to aſcribe the powers of animated to inanimate beings, is the foundation of poetry; and what betrays men, in one ſtage of ſociety, to the loweſt abſurdity, becomes, in another, the ſource of their moſt elegant pleaſure.

An attention to dreams and omens is one of the firſt acts of ſuperſtition, and evidently derived from the aſſociations already mentioned. Not only the civil magiſtrates and military commanders, but philoſophers, in the brighteſt periods of Greece and Rome, were enſlaved by this obſervance. Pythagoras and Plato, ſays Cicero‡, to increaſe the certainty of dreams, direct certain forms and diet pre-

* Plutarch in Alcibiad. † Montfaucon L'Ant. Expl. tom. IV. ‡ De Divinat, lib. II.

paratory

paratory to ſleep. Socrates predicted, while in priſon, that he ſhould die within three days, becauſe he dreamt that a perſon repeated to him that verſe of Homer, "on the third day thou ſhalt arrive at the fertile Phthia." Ariſtotle wrote expreſsly on this ſpecies of Divination (B). Zeno, Cleanthes, Chryſippus, Babylonius Diogenes, Antipater and Poſidonius, are enumerated by Cicero, as writers on this ſubject. That the auſpices were employed with a political deſign there can be no doubt, and their utility was fully experienced in the aſſemblies of the people: they were likewiſe very ſerviceable in promoting diſcipline in the armies. The attention of the ancients to omens, in their military expeditions, was minute and conſtant, nor could any neglect of them be eaſily forgiven. The loſs of the Roman fleet, under Claudius Pulcher, was generally attributed to his having drowned the holy chickens (C), and the death of Marcellus was imputed to his neglect of the omens which forbid his advancing againſt the enemy *. Inſtances of this kind occur in every page of ancient hiſtory, let us take one for all. When the Athenian fleet was juſt quitting the harbour, to attack the Corcyrians, the pilot happened to hear one of the rowers ſneeze, by which he was ſo much intimidated, that he ordered the ſignal to be given for returning to their ſtation, as if they had weighed anchor inauſpiciouſly; and

* Cic. and Plutarch.

they

they would have returned to their anchorage, if the admiral, Timotheus, had not ſuddenly exclaimed, do you wonder that of ſo many thouſands, one man ſhould be troubled with a defluxion* ?

It is a ſtriking circumſtance in the character of Pompey, that while he was diſputing the empire of the world with his great rival, he collected auſpices from all quarters†, confiding in their truth. It appears that the augurs knew how to make their predictions agreeable, for Cicero ſays that every thing happened contrary to them; *omnia fere contra ac dicta eveniſſe* (D).

We may indulge our curioſity in remarking, how nearly the moſt poliſhed nations of antiquity, in theſe ſuperſtitions, approach the Indian tribes of North America. All the marches of the Indians are regulated by the dreams of the old warriors, who, under this pretence, often convey information gained by ſpies to the young men: but it muſt be obſerved that they only pay attention to dreamers of eſtabliſhed character. They have their regular diviners, or conjurers alſo, who are at the ſame time phyſicians. When a diſeaſe proves mortal, the doctor is frequently in danger from the reſentment of the patient's friends: from this riſk, the progreſs of refinement has happily exempted the phyſicians of Europe. In every Indian village, the war-woman alſo is a kind of oracle; by dreams and preſages,

* Frontin. Strat. lib. II. † Cic de Divin. lib. II.

ſhe

ſhe directs the hunters to their prey, and the warriors to the enemy, and is rewarded with a ſhare of the ſpoils; but the unhappy female who aſpires to this dignity, and whoſe preſages are fallacious, (for there are frequently rivals) never eſcapes without a ſevere beating. Theſe circumſtances recall to the mind Cæſar's account of the ancient Germans, and they are not the only ones in which the Indians ſtrongly reſemble the Celts.

A perſuaſion ſo general and ſo permanent muſt depend on aſſociations not more remote than thoſe enumerated, but when we trace it, through the viciſſitudes of governments, and alterations of manners, to the very cloſe of the laſt century; when we diſcover that ſome of the firſt men in rank and abilities, of ſo late a period, ſupported it, and that ſober and learned writers have defended it a few years back, we muſt admit the influence of long-eſtabliſhed cuſtom, and the dignity of antiquity to have powerfully aſſiſted this deluſion. Artifice and credulity have alſo conſpired to its permanency; and the Aſtrological phyſicians, founding their opinions on ſome phænomena in the courſe of diſeaſes, which later obſervations ſeem to extend *, had their full ſhare in this operation. Cardan was one of the moſt celebrated medical aſtrologers, and boaſts with much ſatisfaction, that on being informed of the ſymptoms for which Hamilton, Archbiſhop of St.

* See Dr. Balfour's Obſ.

Andrews

Andrews, wiſhed to conſult him, he declared without heſitation the exact ſituation of the planets at his nativity, which he afterwards verified, by calculating his horoſcope. Several hiſtorians relate that after curing the Archbiſhop, he foretold the manner of his death; but the truth of this aſſertion is extremely doubtful, for Cardan, who was not diſpoſed to conceal his own excellence, would not have failed to boaſt of ſo extraordinary a circumſtance, yet we find no trace of the prediction in his works, though he publiſhed Hamilton's Horoſcope, among others, with a commentary. Porta and Fernelius followed Cardan in combining medicine with aſtrology. Paracelſus, by ſuppoſing a ſpirit derived from ſome conſtellation to reſide in every human being, rendered the connection ſtill more intimate. Severinus and Hartmann followed his opinions. Horſtius believed not only that certain conjunctions of the ſtars produce epidemics, but that evil aſpects produce miaſmata*. The grave and ſagacius Lommius ſuppoſes that the appearance of comets preſages the plague†.

At length, the Carteſian Philoſophy produced inquiries that terminated in more rational concluſions reſpecting medicine; the influence of ſome of the planetary bodies on the human frame was allowed, as far as they could be ſuppoſed to affect the ſtate of the atmoſphere, but the effect of their

* Page 258. † Obſ. Med. p. 31.

aſpects

aſpects was denied. But the opinion was not ſo ſpeedily diſcredited among other claſſes of men, as with phyſicians. Some of the firſt characters in France were infatuated with their belief in pretended prophets. Wierus* ſays they were remarkable in his time on this account. Sully declares that one of the conſiderations which kept him faithful to his maſter, in the moſt unpromiſing ſtate of his affairs, was a prediction of La Broſſe, that Henry would make his fortune†; Henry himſelf was very uneaſy, before his aſſaſſination, on account of ſome prophecies‡. The aſtrologer Morin directed Cardinal Richlieu's motions in ſome of his journies§.

In this country prophecies were always eagerly attended to: Commines ſays, that in his time, an Engliſhman was never without a prophecy in his mouth. The ſtatute of Queen Elizabeth againſt falſe prophecies, was occaſioned by the diſturbances they excited in the ſtate; the Earl of Northampton, in his *Defenſative*, aſſerts that they had produced many civil commotions, and this aſſertion is repeated by Sir Edward Coke. During the reign of James I. the faſhionable opinions encouraged every ſpecies of deluſion: Lilly was an uſeful tool to the Long Parliament, and if we may truſt his own repreſentation, con-

* De Preſtig. Demon.
† Memoir.
‡ Mem. de Sully.
§ Bayle Art. Morin.

ſidered

ſidered by them with reſpect; aſtrologers and prophets ſwarmed at that time, and the credit given to them will ceaſe to ſurprize, when we recollect that the predictions of Rice Evans, who lived then, have found defenders in Warburton and Jortin*. To theſe we may add the names of Cudworth and Morhoff; the former defended prophecies in general, the latter the quatrains of Noſtradamus†. It was in 1707, when this nation was advancing rapidly in the career of ſcience, as well as of arms, that the French prophets appeared among us. They ſpoke Latin and Greek without underſtanding either, as they pretended (E). It muſt be confeſſed that theſe inſpired paſſages are extremely barbarous, but they made noiſe enough to attract the notice of government, and the prophets finiſhed their miſſion in Bridewell. A fact deſerving more attention, is that at this time, when the extenſion of knowledge and reaſon is ſo proudly boaſted, and in this iſland of philoſophers, as ſome delight to term it, the poſſeſſion of a prophetic faculty is believed in ſome of the northern parts of the kingdom; and *that* ſupported by evidence ſo ſtrong, as nearly to convince one of the moſt acute philoſophers of the age, in his viſit to thoſe regions. This ſpecies

* See the Appendix to the firſt vol. of Jortin's Eccleſ. Hiſt.

† Polyhiſt. lib. I. cap. X. tom. I.

of

of divination, ſecond ſight, or *Taiſh* as it is called by the natives, conſiſts in a day-viſion: as I know no better deſcription of it than Thomſon's, I ſhall borrow his words.

> As when a ſhepherd of the Hebride iſles,
> Plac'd far amid the melancholy main,
> (Whether it be lone fancy him beguiles,
> Or that aërial beings ſometimes deign
> To ſtand embodied to our ſenſes plain)
> Sees on the naked hill, or valley low,
> The whilſt in ocean Phœbus dips his wain,
> A vaſt aſſembly moving to and fro;
> Then all at once in air diſſolves the wond'rous ſhow.
>
> CAS. OF INDOLENCE, C. I.

A very diſtinct view of the Second Sight may be found in Martin's Hiſtory of the Weſtern Iſlands, with a large collection of narrations, furniſhed chiefly by the author's friends; ſeveral communicated by the *Seers* themſelves. The viſions are frightful, and uneaſy to the Seer, who thinks himſelf unfortunate in poſſeſſing this faculty. His appearance to the ſpectators, during a viſion, (for he alone perceives it) is, as deſcribed, ſomething like that of a patient in catalepſy; he becomes immoveable, his eyes are fixed, and the eye-lids ſometimes reverted. However if another Seer be preſent, the firſt can make him participate the viſion, if he has preſence of mind enough to touch him. They do not always underſtand the meaning of what

they ſee, and even when they form an abſolute prediction, in conſequence of former experience, they are treated with deriſion. *Horſes* and *cows*, adds my author, poſſeſs the ſecond ſight. Whatever may be the caſe with theſe ſagacious animals, it appears highly probable that the Seers are hypochondriacal perſons. Their inſular ſituation, their ſolitary employments, their oppreſſive poverty, added perhaps to the wild, uncultivated ſcenes of their country, are ſufficient to produce a depraved ſtate of body, and conſequently of imagination, in thoſe who are at all pre-diſpoſed. A proof that the viſions originate in the perſon's own fancy, is given, undeſignedly, by Martin himſelf. He relates that a Seer informed him, he was entirely relieved from his viſions by wearing a ſprig of St. John's-Wort quilted in the cape of his coat. Whatever effects this plant (called Fuga Dæmonum from its ſuppoſed virtues) might have produced internally as a bitter, no medical qualities could be exerted by it in this caſe; and it is difficult to account for the contempt with which Martin confeſſes the predictions were at firſt treated, otherwiſe than by ſuppoſing that the greater number had proved fallacious.

Wierus ſupplies an ample liſt of the different ſpecies of divination. The Chryſtallomantia is well known in this country, by the fame of Kelly and Dee. This conſiſts in appearances of ſpirits,

or

or natural objects, deſired to be ſeen, in a magical lens. Meric Caſaubon publiſhed Dee's Conferences with Spirits, in a large folio, accompanied with a Preface. Some curious particulars reſpecting this man, of Evans, and Forman, who was employed in Somerſet's affair, may be found in Lilly's Life; or in the Antiquarian Repertory, where they have been lately republiſhed.

Martin relates that a ſpecies of divination had been practiſed in ſome of the weſtern iſlands, within his memory, which does not appear to have prevailed in the reſt of Europe; at leaſt I find no notice of it among the demonologiſts. The perſons deſirous of an oracle went into a ſolitary place, carrying with them an ox, which they killed on the ſpot. A fire was then made, under a rock, or near a tree, the animal was flayed, and the boldeſt of the company was wrapped up in the hide, tied faſt, and left alone during the whole night, to expect an anſwer to the demand made by his friends, from inviſible beings whom he heard about him. Martin adds that he had this relation from a perſon who himſelf had paſſed a night in the hide, and who aſſured him that he heard ſuch dreadful things during that night, that no temptations ſhould ever induce him to expoſe himſelf again in the ſame ſituation (F). It is remarkable that this ſort of oracle ſhould be ſo little known

to demonologiſts, ſince we meet with nearly the ſame thing in the Eneid, when Latinus conſults the oracle of Faunus:

> - - - - - - - huc dona ſacerdos
> Cum tulit, et cæſarum ovium ſub nocte ſilenti
> Pellibus incubuit ſtratis, ſomnoſque petivit;
> Multa modis ſimulacra videt volitantia miris,
> Et varias audit voces, fruiturque Deorum
> Colloquio, atque imis Acheronta affatur Averni.
>
> Lib. VII. 86.

The inhabitants of the weſtern iſles uſed to divine, alſo, by roaſting a cat.

The original opinion of *Magic* ſeems to have been formed merely from the ſuperior knowledge or dexterity of individuals. The fulleſt proof of this may be found in Naudé's *Apology for great Men accuſed of Magic*; where he makes it apparent, that, at particular times, ſuperior abilities always drew this imputation on their poſſeſſor. And all the writers on this ſubject allow, that natural magic, which is their firſt diviſion, implies no more than an acquaintance with the leaſt obvious facts of natural philoſophy*. Excellence in a particular profeſſion ſometimes conſtituted a magician; thus, in the laſt century, Dr. Bartolo was ſeized by the inquiſition at Rome, on a charge of necromancy, becauſe he unexpectedly cured a nobleman of the gout†. It is

* See Agrippa, Cicogna, Morhoff, &c. &c.

† Eryth. Pinacoth. II. p. 75.

probable

probable, that for a long time, magicians were ſuppoſed to operate only by natural means, the powers of which could not be eſtimated in times of general ignorance. The repetition of verſes, or the preparation of herbs, were the firſt magical acts: Cicero imputes the origin of the word *Saga* to the ideas I have been deſcribing. *Sagire enim ſentire acuté eſt; ex quo ſagæ anus, quia multa ſcire volunt, & ſagaces dicti canes**. But by degrees, religious opinions were interwoven with magic, and at length Plato's hypotheſis of aërial demons furniſhed a ſyſtem from which magical arts were explained with ſufficient plauſibility. *Quanquam Platoni credam*, ſays Apuleius, *inter Deos & homines, natura et loco medias quaſdam diverorum poteſtates interſitas, eaſque divinationes cunctas & magorum miracula gubernare*†. After the eſtabliſhment of chriſtianity theſe operations were aſcribed to diabolical influence, exerted by compact with the magician. The differences of this opinion will be explained preſently.

Magic is uſually divided into natural and divine, lawful‡, and unlawful‖. Necromancy conſiſted in employing members of dead bodies as charms or remedies: according to this definition, it was necromantic in all the colleges of Europe to inſert the human ſkull as a remedy in their diſpenſatories. But a complete table of

* De Divinat. lib. II.
† Apologia Prima.
‡ Or ceremonial.
‖ Or demoniacal.

its diviſions, with the operations which they ſeverally include, may be ſeen in Paracelſus's Philoſophia Sagax, where its branches appear very numerous. Of all theſe, however, the diviſion of witchcraft, including poſſeſſions, has excited moſt attention, and has indeed been moſt intereſting, as a theological, legal and medical queſtion. It is chiefly with reſpect to the laſt that I mean to conſider it.

I ſhall not meddle with the controverſy of Jannes and Jambres, the magicians of Pharaoh, nor inquire whether the witch of Endor had a cloſet*, neither is it neceſſary to collect the claſſical authorities for witchcraft: all this has been fully done†, and every thing, credible and incredible, relating to the civil and religious hiſtory of the ſubject may be found in Wierus, Delrio, and in a very extraordinary book, entitled the Imaginations of Mr. Ouffle, which, with the moſt childiſh arrangement, and great poverty of invention, exhibits the completeſt collection of demonological facts to be found in any one work.

That in early ſtates of ſociety, diſeaſes were ſuppoſed to be inflicted by ſupernatural powers, is an acknowledged fact, and follows naturally from the general principle, of men's anxiety to ſurmount their ignorance of the relations of cauſe

* See Scott and Webſter. † Wier. de Lamiis.

and

and effect. The diſpoſition, which, in one age, made Eſculapius a god, in another, made Dr. Bartolo a necromancer; among the Egyptians the offices of prieſt and phyſician were originally joined; among the Jews, the prieſt cured the leprous; among the Greeks, ſpaſmodic diſeaſes, and particularly epilepſy, were imputed to the anger of the gods, and managed by diviners. The firſt part of Hippocrates's Treatiſe De Morbo Sacro is written againſt this ſuperſtition, and contains a curious account of the diagnoſis formed by the medical diviners. *Siquidem namque (ægri) capram imitentur, & balatum edant, dextramque in partem convellantur, deorum matrem in cauſa eſſe aſſerunt. Si vero acutiorem & vehementiorem vocem edat æger, equo ſimile eſſe dicunt, & ad Neptunum cauſam referunt. Quod ſi ſtercoris aliquid emittat (quod nonnullis morbo preſſis contingit) Hecates Enodiæ appellatio adhibetur. Sin autem tenuius & crebrius dejiciat, velut aves, Apollo Nomius. Si verò ſpumam ex Ore demittat, & pedibus calcitret, Mars author eſt.* He adds that beſides the employment of ceremonies, they forbad their patients to wear a black veſtment, becauſe black denoted death, or to ſleep on a goat-ſkin, or to place either hand, or foot, upon the other. According to theſe rules, ſays he, a Libyan would never be cured of this diſtemper, for in Libya goat-ſkins are univerſally worn and ſlept in.

Galen followed Hippocrates in aſcribing all diſeaſes to natural cauſes, and Avicenna Galen. An expreſſion in Hippocrates's Prognoſtics, however, puzzled them a little, and was long urged by demonologiſts, who always think themſelves at liberty to repreſent facts and opinions in the way moſt favourable to themſelves. Thus Quinctius's collection of dreams, apparitions and prophecies retailed in Cicero's firſt book of Divination, is quoted largely by thoſe writers, without any notice of the refutation produced in the ſecond. Hippocrates has ſaid that a phyſician ought to diſtinguiſh what is *divine* (τι θειον) in diſeaſes. As this apparently contradicts the ſentiments delivered in his Treatiſe de Morbo Sacro, Galen, in his Commentary on the paſſage, ſuppoſes that the phraſe is a græciſm, though it appears to have been generally underſtood in the literal ſenſe; he explains it to ſignify, that a phyſician ſhould ſtudy the nature of the atmoſphere, from which ſo many diſeaſes were ſuppoſed to proceed. Aretæus ſupplies an uſeful criticiſm on the word ἱερον as applied to epilepſy, which ſtrengthens Galen's ſuppoſition. The diſeaſe is thus termed, according to him, on account of its ſeverity, becauſe ἱερον and μεγα were ſynonimous with the Greeks. Among the modern commentators on Hippocrates, Horſtius has the ingenuity to reconcile his opinion, and that of Galen, with his own. He allows that

Hippocrates

Hippocrates muſt allude to the nature of the atmoſphere, but thinks he refers to an occult quality produced by the immediate act of divine power, or, according to his own theory, by aſtral influence.

It would have been happy for Europe, if phyſicians, after the revival of letters, had followed the wiſe and temperate dictates of their great maſter, with as much care as they inveſtigated his uncertain hypotheſes. As medical men generally determined the nature of the diſeaſes imputed to faſcination, ſome ſpirited deciſions on the ſide of common ſenſe might have checked the ſanguinary proceedings, which diſgraced all the ſixteenth, and great part of the ſeventeenth centuries. But a paſſion for myſticiſm, which in one ſhape or other haunts the infancy of literature, as well as of ſociety, ſeized the faculty, and they dictated, at their eaſe, thoſe wretched abſurdities, by the authority of which hundreds of their fellow-creatures were ſubjected to impriſonment, tortures, and an agonizing death.

I cannot proceed without obſerving, that the hiſtory of this deluſion is a perpetual reproach, to thoſe who treat all innovations in ſpeculative opinions with indignation: the firſt writers againſt the doctrine of witchcraft were ſtigmatized as *atheiſts* *, yet they only endeavoured

* By Dr. Henry More, Glanville, and Cudworth, in this country.

to

to prove the imbecility of the perſons taxed with ſupernatural operations, and the infatuation or knavery of their accuſers.

- - - - τάφοι δὲ πυραί — καίοντο θαμειαί.
ΙΛΙΑΔ. Α.

For a conſiderable time after the *Inquiſition* was erected, the trials of witches (as heretics,) were confined to that tribunal, but the goods of thoſe who were condemned being confiſcated to the holy office, its miniſters were ſo active in diſcovering ſorcerers, that the different governments found it neceſſary to deprive them of the cogniſance of this crime*. On the continent, commiſſioners were then appointed for the diſcovery and conviction of witches, who, though leſs active than the inquiſitors, were but too zealous in proſecuting their function. In 1494, Sprenger and Inſtitor, two perſons employed in this commiſſion, publiſhed a collection of trials, moſt of which had come before themſelves, under the title of *Malleus Maleficarum*; this ſerved as a kind of inſtitute for their ſucceſſors. Soon afterwards, the appearance of Agrippa's Occult Philoſophy ſtrengthened the deluſion, although that celebrated man did not credit the power of ſorcerers†. He believed indeed in magic, but it was on the principle generally allowed at that

* Cardan.

† Naudé's Apolog. p. 193.

time,

time, that there was an exact conformity between the viſible and inviſible worlds, conſequently a poſſibility of affecting what is unſeen, by its ſympathy with the natural ſubject, on which the magician operates(c). He alſo believed it poſſible to eſtabliſh a commerce with with angels. But the fourth book of the occult philoſophy, which contains the forms for invocating demons, and deſcriptions of their different appearances, according to the method of invocation employed, is declared by Naudé and Wierus to be ſpurious, as well as the ridiculous treatiſe imputed to Trithemius. Upon the whole, Agrippa appears in the three firſt books, where he is moſt myſtical, to confide in natural means, or angelic influence. His book, however, procured him the character of a ſorcerer, which was confirmed by his keeping a pug-dog with a collar, ſuppoſed to be an imp, and was put beyond all doubt by his exerting his influence to ſave a poor woman, accuſed of witchcraft, from the flames, at Cologne. Wierus, who had ſerved Agrippa, gave riſe to the firſt great controverſy on this ſubject*. His maſter had taught him humanity, and he endeavoured, but with too feeble a hand, to ſtop the bloody proceedings of the judges. Wierus appears to

* Bodinus ſays that ſome perſons, before Wierus, attempted to ſhew the innocence of witches.

have

have been a well-diſpoſed, weak man, with extenſive reading on his ſubject, but too narrow-minded to comprehend it thoroughly. He involved himſelf in unſpeakable difficulties, by admitting the action of ſupernatural powers in certain diſeaſes, and in poſſeſſions, while he denied that witches had any concurrence in them. Theſe appearances, ſaid he, are illuſions of the devil, who perſuades ſimple and melancholy perſons that the miſchief he himſelf performs, is done by them, and at their pleaſure. He was weak enough, to attempt the explanation of every ſtory alleged by his antagoniſts, without queſtioning the truth of the facts. What puzzled him moſt was the *dura materies*, that is, the crooked pins, old nails, black flannel, and other ſubſtances (or *varia materies*) vomited by the patients. There were three hypotheſes for this phænomenon; 1. That the matter was only *apparently* diſcharged, by an illuſion, for Grillandus, an eminent lawyer, obſerved that when the ſubſtances vomited were kept for ſome days, they began to liquify, and at length diſappeared: 2. Or that the devil enlarged the pores of the body, ſo as to introduce the *dura materies*, and then ſhut them up again; this was the opinion of Paracelſus and others*: 3. Or that the devil introduced theſe ſubſtances into the mouth, &c.

* Wier. de Maleſ. Affect. p. 313.

at

at the very moment when the aſſiſtants perceived them. This laſt opinion was adopted by Wierus, and certainly was a nearer approach to truth than the others, as it has been found that ſecuring a patient's hands has prevented him from vomiting the *dura materies**, of which his pockets were full. A ſingle inſtance will ſhew, however, that Wierus was exceſſively embarraſſed by this hypotheſis†. A girl complained of ſudden pain in her ſide, and aſſerted that ſhe felt a knife ſticking in it, which ſhe had juſt borrowed from her ſiſter; her relations laughed at this as an idle fancy, but on the burſting of an abceſs which had formed on the ſeat of the pain, the point of a knife became viſible, and the inſtrument was extracted by a ſurgeon from Wolfenbuttel. Wierus, being a phyſician, knew very well that a knife ſix inches long could not be thruſt into the cellular ſubſtance without any external appearance of wound or hæmorrhage; therefore he ſuppoſes the devil to have laid the knife upon the abceſs, ſo as to diſcover the point, but to have concealed the handle by an illuſion, *reliquam cultelli partem præſtigiis velaſſe*. But as the knife was ruſty, he believes the demon had kept it in ſome dunghill, and as its ſubſtance was corroded, he muſt have ſteeped it in an acid. This is a

* Hutchinſon's Eſſ. on Witchcraft. † P. 307, & ſeq.

ſufficient

ſufficient ſample of the ingenuity of doctor Wierus(H). He was very anxious to prove that Agrippa's dog was not a demon, but a natural dog, called Monſieur*: this ſtrengthened the imputation caſt on him by his adverſaries, of ſorcery.

Bodinus, a French lawyer of eminence, who had aſſiſted at ſeveral trials of witches, wrote againſt Wierus, in his Demonomaniâ. He urged the concurrent teſtimonies of ſufficient witneſſes, and the confeſſions of the witches themſelves, to eſtabliſh the exiſtence of ſorcery. Wierus owned that the unhappy perſons believed themſelves to be guilty of the crimes alleged againſt them, but that they were deceived by the devil. But what do you make of the witches' meetings, cried Bodinus? The witches, replied his antagoniſt, are atrabilious. This explanation was ſo unſatisfactory that Wierus paſſed for a magician, whom the devil had furniſhed with ſpecious arguments, to ſave others from puniſhment. Lerchemer, Godelmann, Ewichius, Ewaldus, and ſome others followed him, notwithſtanding this ſtigma; but they were oppoſed by men of more acuteneſs and conſiſtency than themſelves; by Remigius, who had condemned ſeveral hundreds of ſorcerers to the flames, Delrio, whoſe book is a complete Corpus Magiæ, Cujas, Eraſtus,

* De Magis Infamib. p. 111.

Scribonius,

Scribonius, Camerarius*, and a croud of others. Let us see what physicians thought of this controversy.

Paracelsus allowed that diseases may be produced by witchcraft, that is, by a demon, in compact with a human being†; but he thought the devil had more to do with the art of medicine itself, than with its objects. He imagined that this cunning adversary endeavoured to ruin medical practice, by raising up quacks, publishing erroneous books, and setting up ignorant apothecaries, that he might discredit the faculty, and bring patients to place their confidence in his own tools. *Medicinam enim intaminatam diabolus non sinit, sed suscitat pseudomedicos, profert erroneos libros, imperitos Pharmacopœos, &c. hoc fine, ut naturalibus mediis sua laus derogetur*‡.

Van Helmont also believed that the devil produced diseases, but that he operated on the magnetic spirit, which shall be considered elsewhere. He thought witches employed natural means; *sagæ operantur virtute naturali*‖.

Paracelsus was loudly blamed for permitting magical remedies to be used, where the disease was imagined to be demoniacal. He was called a sorcerer. So difficult was it for a writer at that

* Delrio. and Burton's Anat. of Melanch.

† De Sagis. ‡ Ver, Influent, Rer.

‖ Ort. Medicin. 479.

time

time to eſcape this imputation, that Bodinus himſelf was accuſed of ſorcery by De Thou.

Sennertus, the firſt eclectic philoſopher and phyſician of Germany, wrote an expreſs treatiſe De Faſcinatione. He believed that witches injure in three different ways; *per viſum, vocem et contactum:* That the plague was often occaſioned by the compoſition of certain powders and ointments, of diabolical preſcription: That the operations of witchcraft are proved by the authority of judicial acts, and by the agreement of witneſſes examined at different times, and in different places, but that the action is always demoniacal, though performed with the witch's conſent. It is true, ſays he, I have cured patients of ſimple inflammatory complaints, which perſons accuſed of ſorcery acknowledged themſelves to have produced; but as there was nothing preternatural in thoſe diſeaſes, I conclude that the devil, foreſeeing the complaints, deluded the witch, by perſuading her to put him on diſtreſſing the patient. He holds that the devil ſometimes occaſions diſeaſes by the medium of natural cauſes, for example, epilepſy, palſy and melancholy; that he ſometimes produces complaints altogether preternatural; and ſometimes only attacks the fancy, occaſioning imaginary diſeaſes; that the nature of the materies dura is uncertain; but that witches are puniſhable for their *compact* and their conſent to injure different perſons.

perſons. He quotes a caſe of witchcraft from Zacutus, a Portugueſe phyſician, author of the famous Definiton of a Spoon*; a young lady was cured of convulſions, in preſence of Zacutus, by putting a paper cap, filled with magical characters, on her head. Dr. Balthaſar Han communicates to Sennertus the caſe of a Lady, who was ſubject to ſudden eruptions of *croſſes* and *aſtrological characters*, on different parts of her ſkin: it is remarkable that Dr. Warburton quotes a ſimilar ſtory from Iſaac Caſaubon, to ſupport the miracles attending Julian's effort to rebuild the temple of Jeruſalem†. Mercatus, phyſician to Philip II. of Spain, a writer of uncommon accuracy and information, appears ſtrongly inclined to deny the exiſtence of faſcinatory diſeaſes; but he is conſtrained to acknowledge them for two reaſons; firſt, becauſe the inquiſition had decided in favour of their reality; ſecondly, becauſe he had ſeen a very beautiful woman break a ſteel mirror to pieces, by a ſingle glance of her eyes, and blaſt ſome trees by merely looking on them; *ſolo aſpectu.*

Heurnius did not admit morbid faſcination, but he came round very ingeniouſly to the common ſuperſtition. He finds it recommended to

* See Echard's Dialogue, (againſt Hobbes) and King's Uſeful Tranſactions.

† See his Julian.

drink human blood, and to eat a human liver, for the cure of epilepſy; theſe remedies he ſuppoſes to have been recommended by witches, who are imagined to be fond of human blood. To prove this, he quotes Apuleius and Philoſtratus. It is truly ridiculous to find demonologiſts quoting the romance of Apuleius, (which is a palpable ſatire on magical ſtories,) as true hiſtory (1).

Mylius, Mynſicht and Hofer (forgotten names) all believed the influence of witchcraft in diſeaſes. I ſhall have occaſion to ſpeak of the two laſt, in treating of the remedies for preternatural complaints.

Baptiſta Porta was not only a demonologiſt, but a ſignaturiſt, that is, a believer in the conformity of the virtues of plants to certain external appearances, ſuppoſed to be impreſſed by guardian angels. The convallaria, or Solomon's ſeal, and ſome of the ferns, were celebrated remedies of this kind. A Diſſertation de Simplicium Signaturis was publiſhed at Rome, by Sinibaldo, in 1690.

Severinus and Hartmann were followers of Paracelſus.

Fernel ſaw a demoniac, who ſpoke Greek, without underſtanding it.

Merindol, who flouriſhed at Aix in Provence, about the beginning of the laſt century, had conſiderable practice in faſcinatory diſeaſes; he had the

the capuchins, the nuns of St. Clare, and the Urſulines, under his care, all bewitched(K). In a diſſertation annexed to his works,* he treats very fully of Amulets, which he divides into four kinds, divine, diabolical, vain, and natural. He permits the uſe of the firſt and the laſt.

Dr. Thoner of Ulm relates a caſe of witchcraft, in his conſultations, which will be mentioned more particularly hereafter. Carrichter is a medical demonologiſt, conſtantly quoted, whoſe works have never come in my way.

Schenkius, in his Section de Demoniacis, affords nothing remarkable, excepting his advice to try exorciſm firſt, and natural remedies afterwards.

Fludd believed diſeaſes to be inflicted by the miniſtry of angels. He publiſhed a Treatiſe de Myſtica Morborum Cauſa.

Dr. Willis, whoſe labours contributed ſo much towards forming the nervous pathology, ſuppoſed convulſive diſorders to originate, in ſome caſes, from witchcraft†. He aſſigns the common rules for diſcovering ſuch appearances, which ſhall be noticed afterwards.

Even the author of Religio Medici, if Dr. Hutchinſon may be credited‡, inclined ſo ſtrongly to this perſuaſion; that being interro-

* Num liceat Periaptis ad morborum curationem uti.

† De Morb. Convulſiv. p. 43.

‡ Eſſay on Witchcraft, p. 151.

gated by Lord Chief Juſtice Hale, concerning a convulſive diſeaſe, attributed to two poor women who were tried before him, "he declared, that he was clearly of opinion, that the "fits were natural, but heightened by the devil, "co-operating with the malice of the witches, "at whoſe inſtance he did the villanies."

In conſequence of this opinion, the criminals were condemned.

Towards the cloſe of the laſt century, Dr. Boulton, an Engliſh phyſician, publiſhed his Medicina Magica, which I have never ſeen. Mean time, the belief in ſorcery was ſo prevalent with the faculty, that a periodical work publiſhed in Germany, to which the firſt phyſicians of the time contributed, was filled with hiſtories of demoniacs, and diabolical illuſions of all ſorts; I mean, the Miſcellanea Curioſa.

One or two cogent examples are there recorded of demoniacal copulation, a ſubject on which ſaints, and fathers of the church, as well as lawyers and phyſicians, have exerted themſelves to accumulate the moſt diſguſting impurities.

Another periodical collection, of conſiderable note, the Acta Hafnienſia, publiſhed by the Bartholines, contains a good deal of demonology. One of the correſpondents relates that a country fellow becoming *poſſeſſed*, recited a page of the Timæus, to every one's aſtoniſhment*. Chriſ-

* T. II.

topher

topher Bartholine heard the following ſtory from the mouth of the ſufferer (a miner.) Going to his work one morning, the devil met him, in form of a little man, and offered him a pinch of ſnuff. This, the workman thought proper to decline; the devil, enraged to find his courteſy deſpiſed, flew upon him, and beat him ſeverely*.

In the ſame work, is a conſultation of Dr. Hannerman on a caſe of impotence; the doctor's firſt inquiry is, *an naturale, an magicum vitium ſit*†?

In this country, while the belief in witchcraft was ſupported by royal authority (for James I. is univerſally known to have written on demonology) countenanced by Bacon‡, and generally adopted among the people, only one writer was hardy enough to oppoſe it. This was Reginald Scott, who publiſhed a collection of impoſtures detected, under the title of Diſcoveries of Witchcraft. James ordered the book to be burnt by the common executioner, and the judges continued to burn witches as uſual. During the civil wars, upwards of eighty were hanged in Suffolk, on the accuſations of Hopkins, the witch finder‖. Webſter was the next writer againſt witchcraft, but he had a different fate from that of Scott, for moſt of his arguments were refuted by

* Ib. p. 12. † Act. Hafn. T. III.

‡ Nat. Hiſt. Cent. X.

‖ Baxter, Hutchinſon, and Hudibras, C. III.

Glanville. This very acute writer was induced to publiſh his *Philoſophical Conſiderations about Witchcraft*, by the apprehenſion, that the increaſing diſbelief of witches and apparitions tended to affect the evidences of religion, and even of a Deity. In reſpect of argument, he was certainly ſuperior to his adverſaries; his reaſoning is perſpicuous, though ſometimes ſubtle, reſted on the moſt ſpecious foundations of evidence, and arranged with great ſkill. In the firſt edition, he contented himſelf with relating the celebrated ſtory of Mompeſſon, as an example of the reality of demoniacal illuſions, but afterwards he collected a conſiderable number of hiſtories*, which were publiſhed after his death by his friend Dr. Henry More, who took an active part in the controverſy, and ſubjoined to the Saduciſmus Triumphatus, as Glanville's book was now entitled, a diſſertation of his own, on the True Notion of a Spirit. Dr. More had previouſly related various abſurd ſtories in his Antidotus Adverſus Atheiſmum, for, in the abundance of his zeal, he alſo conſidered the denial of the power of witches as atheiſtical. The celebrated Baxter added his name to the defenders of witchcraft; he made great uſe of the German demonologiſts, and of the unhappy affair in New England. He thought the devil ſo

* In this collection, by Dr. More's confeſſion, there are conſiderable miſtakes both of perſons and places.

action

active againſt well-diſpoſed perſons, as frequently to raiſe whirlwinds, in order to carry away their linen, when hung out to dry: truly, ſays he, I have often wondered to ſee my own ſmall linen caught up in an eddy, and carried out of ſight, over the church-ſteeple*! (L) Several others engaged in the controverſy, a liſt of whoſe works may be found in the dedication to Dr. Hutchinſon's hiſtorical eſſay concerning witchcraft, publiſhed about ſeventy years ago; a book which comprehends the moſt ſatisfactory proofs ſubverſive of this opinion. Dr. Hutchinſon alſo ſupplies a very good chronological view of the deluſion.

On the continent, this controverſy ſeemed almoſt forgotten, till Bekker publiſhed his Monde Enchantée, in which he denied the exiſtence of witches on the Carteſian principle, that the Deity is the ſource of all action, conſequently actions ſo oppoſite to his nature and attributes cannot be ſuppoſed to exiſt. He was anſwered by *Frederick Hoffman*, the father of the modern theory and practice of medicine, in his Diſſertation De Diaboli Potentia in Corpora†. Dr. Hoffman ſets out with the uſual aſſertion of demonologiſts, that the facts eſtabliſhing the doctrine are as certain as any in hiſtory; that the devil can alter the ſtate of the atmoſphere at pleaſure, ſo as to raiſe ſtorms; that he can

* Certainty of the World of Spirits.

† Printed in the fifth volume of his Works, p. 98.

produce inſects by his own power; that, with reſpect to the human ſubject, he can act upon the animal ſpirits, or even on the imagination, though he cannot divine our thoughts; and here the good doctor takes occaſion to praiſe the devil's learning; "he is an excellent optician and natu-"ral philoſopher," ſays he, "on account of his "long experience;" *ſummus opticus et phyſicus, propter diuturnam experientiam.* This great man, who has ſo finely illuſtrated the theory of ſpaſmodic diſeaſes, thinks they are ſometimes produced by witchcraft, although he conſiders the witches merely as paſſive inſtruments of the demoniacal action: he relates the caſe of a woman who was afflicted with a ſevere head-ach, from the time of her refuſing to ſell a calf's head to a ſuppoſed witch, and does not ſcruple to conſider the diſeaſe as an effect of the witch's reſentment. This diſſertation was publiſhed in the large edition of his works, by the doctor himſelf, in 1747. From the time of Hoffman, I am not acquainted with any reſpectable writer in favour of witchcraft (excepting that Brucker mentions incidentally, in his excellent Hiſtoria Critica Philoſophiæ, in 1766, that he thinks the queſtion ſtill undecided*) till the year 1770, when Dr. de Haen of Vienna publiſhed a defence of magic, chiefly on the authority of Philo-

* Tom. V. p. 711.

ſtratus,

ſtratus, and the fathers of the church. But at that time, the opinion was ſo completely exploded among the faculty, that he did not provoke a ſingle antagoniſt.

The number of thoſe who have been ſacrificed to this deluſion cannot perhaps be aſcertained; by Dr. Hutchinſon's collection of facts it appears, that, at certain times, many victims have fallen together, and it is a remark not peculiar to him, that the condemnation of one witch has always led to the diſcovery of others. The lateſt phrenzy of this kind, was that in New England, about 1692, when, ſays Hutchinſon, the *impriſonment and execution of witches made as great a calamity there as a plague or a war.* The accuſers became ſo daring, that neither civil nor religious authority would have proved a ſecurity againſt their attacks, if all the proſecutions had not been ſuddenly dropped, and the priſoners ſet at liberty. So far did thoſe wretches proceed in abſurdity, that a dog was accuſed of throwing perſons into fits, by looking at them*.

One Parris, a miniſter at Salem, was at the bottom of this horrible buſineſs, but it is worth while to obſerve, as a key to the diſpoſitions of the people, who ſubmitted to ſo groſs and fatal an impoſition, that they believed the Indians to be magicians; and Mr. Cotton Mather imputed

* Hutchinſon, p. 107.

the

the frequency of witchcraft, during the general deluſion, to ſpirits ſent among them by the Indian conjurers, or *Paw-waws*, as the coloniſts term them*. Another inſtructive circumſtance is, that as ſoon as the proſecutions were ſtopped, all reports of witchcraft ceaſed.

In this country, the diſcouragement long given to all ſuſpicions of witchcraft, and the repeal of the ſtatutes againſt that crime, though they have much weakened, have not eradicated the perſuaſion; ſome periodical publications, conducted by men of letters, afford proof of this, and the Briſtol ſtory, though unpubliſhed, is a recent and ſtriking confirmation.

In 1786 however, the Count de Caglioſtro was accuſed of ſorcery by Madame de la Motte†, at Paris.

It will be eaſier to diſcover the ſources of deception in thoſe caſes, if we conſider the ſigns of faſcination in the patient, eſtabliſhed by demonologiſts; the indications by which the ſorcerer was traced; and the nature of the remedies which have proved ſucceſsful in demoniacal caſes.

I. 1. A ſudden attack of any diſeaſe, in a perſon previouſly in good health, was held a reaſon for

* Id. p. 101. Maſſinger has made uſe of this opinion, in his City Madam.

† Memoire pour le C. de Caglioſtro.

ſuſpecting

ſuſpecting preternatural influence*. It is evident that this teſt was admitted entirely from ignorance and preſumption, becauſe ſeveral diſeaſes do certainly accede without much previous ſenſible indiſpoſition.

2. When the cauſe of a diſeaſe did not readily ſuggeſt itſelf, it was generally attributed to witchcraft†. Thus, the atrophy of infants was long imputed to the power of *evil eyes*, and Sennertus has treated largely of this ſort of faſcination.

3. Convulſive diſeaſes were ſuppoſed to be preternatural, when ſuch muſcles were affected, as produced unuſual contorſions, of a terrifying appearance. The caſe of the Norfolk boy, in the late Dr. Wall's Medical Eſſays, has all thoſe ſymptoms which a demonologiſt would require, to eſtabliſh it as an inſtance of faſcination; and we learn that his parents ſuſpected ſuch an influence. The only thing deficient in this ſtory, for the purpoſe of demonology, is that the boy did not ſpeak Greek or Latin; that is, he wanted juſt ſo much of being an impoſtor. In the ninth volume of the Medical Commentaries, publiſhed in 1786, are three caſes of convulſions, in which the appearances were ſo extraordinary that the country people ſuppoſed the patients were bewitched.

* Dalton's Country Juſtice. † Joubert.

4. Demono-

4. Demonologiſts build much on the *ſpectral ſight*, that is, on the apparition of the witch to a patient, during the fit: this circumſtance procured the condemnation of moſt of the perſons accuſed in New England. It is well known, that ſeveral diſorders are attended with very terrible ſpectral appearances; particularly the ephialtes, or night-mare, the delirium of fevers, and ſome varieties of melancholy and madneſs. It is equally certain, from the trials which have been publiſhed of thoſe unhappy ſufferers in America, that ſeveral of thoſe who thought themſelves bewitched, had no other complaint than the night-mare, during the acceſſion of which, the image of ſome unfortunate neighbour was preſented to them, who paid for the fumes of another's indigeſtion, with life.

Demonologiſts have been much puzzled to account for the ſpectral ſight, for it was long a queſtion among them, whether the devil could tranſport the witch, *bodily*, into a houſe when the doors were ſhut. Dr. More believed that the *aſtral ſpirit* only was carried about; the American demonologiſts ſuppoſed that the devil produced this appearance himſelf, by operating on the patient's imagination: even Dr. Hutchinſon was inclined to Wierus's opinion reſpecting demoniacal interference*. This conceſſion, which the writers

* It was a queſtion ſeriouſly agitated, among demonological writers, whether the devil can appear in the ſhape of a good

writers in favour of diabolical illuſions find themſelves obliged to make, comes near what I believe to be true; that the illuſion ſubſiſts in the patient's imagination: there needs no devil to produce it there.

5. When any natural action was ſuddenly impeded, the patient was ſufficiently apt to ſuppoſe himſelf bewitched, eſpecially if his incapacity was of a diſgraceful nature. This power, imputed to ſorcerers, was termed the ligature, and, according to Wierus and Delrio, who treat of it fully, was not confined to the human body, but extended to inanimate objects; thus, according to Wierus*, a fleet might be bound faſt in port, notwithſtanding favourable winds, and all the efforts of the mariners; he adds that an army may be rendered inactive and uſeleſs, by the *ligature*; events equally ſurprizing have happened in our times, without provoking any ſuſpicion of witchcraft.

6. The appearance of the dura and varia materies, already ſpoken of †, was always reckoned deciſive, where other appearances had given ſuſpicion of a preternatural diſeaſe. When we read of rats, black, ſcaly frogs‡, black flan-

a good man, and eſpecially of a good catholic? (See Lavater de Spectris.) This was generally decided in the affirmative.

* P. 329. † In p. 14.

‡ Thoner. Obſerv. p. 224.

nel,

nel, &c. vomited by patients, it is impoſſible to avoid recollecting Dr. Smollett's ſtory of the *three black crows*, yet Wierus aſſerts that he has taken pieces of flannel out of a patient's mouth, immediately after inſpecting it diligently, to ſatisfy himſelf that nothing was concealed there*. He is obliged to confeſs that the ſubſtance extracted had never been in the ſtomach, becauſe it was *ſcarcely wet*, and if we ſay, in purſuing his theory, that a *confederate* and not a *demon* introduced the *materies* into the mouth, all the obſcurity of the queſtion vaniſhes.

II. 1. In tracing ſuſpicions of magic, it cannot be too often repeated that knowledge and addreſs exceeding the common ſtandard were frequently their ſole foundation. Moſt of the popes were reckoned magicians, according to Wierus†, who adds a particular relating to Gregory VII. which deſerves ſome attention: that Pontiff was held in great veneration, becauſe when he pulled off his gloves, fiery ſparks iſſued from them; *quando volebat*, (Wierus quotes from Benno,) *manicas diſcutiebat ſuas, unde ignis in ſcintillarum modum diſſiliit.* This is a curious anticipation of Canton's diſcovery.

2. The ſigns pointed out by demonologiſts are futile and inconcluſive(M). One of them is drawn from the ſuſpected witch inquiring anxiouſly about the health of the patient. Ridi-

* P. 286. † P. 358.

culous

culous as this may appear, it is to be found among the directions for examining witches, in Dalton's Country Juſtice. The mark, ſuppoſed to be ſet by the devil on theſe unhappy creatures, was one of the moſt certain ſigns, and induſtriouſly ſought for; but Dalton acknowledges that this mark may ſtrongly reſemble a flea-bite. Another ſign confided in by the ſame writer, is the appearance of the witch's familiar, that is, the imp devoted to her, in conſequence of the demoniacal compact. Now Glanville, in his collections, affords ſeveral examples of the familiar appearing in ſhape of a *fly*, and Hutchinſon aſſerts, that the witch finders concluded either a ſpider, beetle, or fly, to be the familiar, if the animal was found in the ſame room with the witch, and could not be killed by the aſſiſtants.

3. Bodinus acknowledges, that direct proof is not always to be expected, in caſes of witchcraft; in which he is followed by Dalton. So zealous was the former, that he thought it juſtifiable to proſecute witches on the ſlighteſt ſuſpicions, or common report; he owned that where nothing could be proved, their lives muſt not be touched, but puniſhment to a certain degree he thought neceſſary. The gentle inflictions of this pious judge, who comprehends fifteen ſeveral crimes under magic, were public whipping, and condemnation to the gallies. Thus, it is evident, the

the criminal had little to hope, even from the deficiency of proof, and the boaſted authority of thoſe public trials vaniſhes on a cloſe examination. But demonologiſts think the facts completely eſtabliſhed by the concurrent teſtimony of witneſſes, and by the confeſſions of witches, obtained without the application of torture. The witneſſes muſt be divided into two claſſes, thoſe who were themſelves deceived, and thoſe who deceived others. Of the firſt, I have pointed out examples in the New England affair, and ſome curious inſtances may be found in the ſtory of the Nottingham boy*; thus, one of the witneſſes depoſed "that he had ſeen the boy "turn his face directly backward, not moving "his body; and that his eyes were as large as "beaſt's eyes; and that his tongue would be "thruſt out of his mouth to the bigneſs of a "calf's tongue." Mark now, how all theſe wonderful circumſtances diſappear, on his croſs-examination: "my meaning was," ſays he, "that he turned his face a good way toward "his ſhoulder, and that his eyes were ſomewhat "goggling; and by reaſon that it was candle-"light when I ſaw his tongue thruſt out, "*and by reaſon of my conceit of the ſtrangeneſs of* "*Somers's troubles*, it ſeemed ſomewhat bigger "than, if he had been well, I ſhould have

* Hutchinſon, p. 242.

"thought

" thought it to have been*. At the ſame time, the commiſſioners, who examined the nature of the boy's fits, were all terrified by ſeeing a black dog in the room, belonging to a Spurrier, which they took for the devil†. In 1633, ſeventeen perſons were condemned at Lancaſter aſſizes, on the evidence of a boy, who afterwards confeſſed himſelf to be an impoſtor; Webſter ſays he heard this confeſſion from the boy's own mouth.

This ſecond claſs of witneſſes got money from the well-diſpoſed ‡, and therefore are of no credit.

Demonologiſts, indeed, profeſs themſelves willing to give up all inſtances where any deception can be pointed out, and confine themſelves to thoſe which are not circumſtantially diſproved; they exult particularly in the ſtory of Mompeſſon, which is publiſhed at great length, in the Saduciſmus Triumphatus. It is true that no impoſition was ever diſcovered in that affair, but it is a ſtrong preſumption againſt the demoniacal nature of the diſturbances, that when the King ſent ſome Gentlemen to inquire into them, every thing was quiet during their reſidence in the houſe. Glanville excuſes this, by ſaying that

* Id. p. 260. † Id. Ib.

‡ The Robinſons, who accuſed ſeventeen at Lancaſter, went from pariſh to pariſh, and received contributions—Hutchinſon.

the noiſes ſometimes ceaſed for weeks together; but, conſcious of the weakneſs of this apology, he adds, that probably the devil did not think it for his intereſt, to give the wicked courtiers any proof of his exiſtence.

When the confeſſions of the perſons accuſed were obtained by torture, it is evident that no dependance could be placed on them; it is painful to read what Wierus and Hutchinſon have collected on this ſubject. The credit of the Suffolk trials, on which Baxter inſiſts, is totally deſtroyed, by the evidence which Dr. Hutchinſon produces, of Hopkins the witch finder having ſubſiſted by that practice. But let us hear ſome of theſe confeſſing witches ſpeak for themſelves. Six of the women accuſed in New England, aſſign the following reaſons for having confeſſed; that they were ſurprized and frightened out of their judgment, by being ſuddenly ſeized and put in priſon; that their relations perſuaded them that confeſſion was the only ſtep by which their lives could be ſaved; "And indeed that "confeſſion that it is ſaid we made, was no other "than what was ſuggeſted to us by ſome Gentle-"men, they telling us we were witches, and "they knew it, and we knew it, and they knew "that we knew it, which made us think that it "was ſo, and our underſtanding, our reaſon and "our faculties being almoſt gone, we were not "capable of judging of our condition; and moſt

of

"of what we said was but a consenting to what "they said. Some time after, when we had "been better composed, they telling us what we "had confessed, we did profess that we were "innocent and ignorant of such things*." Several other confessions, recorded by authors, are the language of total imbecility, or madness. An old woman, mentioned in Hutchinson's Chronological View, confessed that she had killed several persons, even when interrogated, purposely, whether she had killed some who were then alive and in good health†. Wierus relates that a judge demanded of a famous witch, then in chains, by what means a man could be preserved from the force of sorcery; to which she seriously replied, by keeping together all his old shoes‡. The unhappy lunatic was burnt alive. By similar confessions, the doctrine of the lycanthropia was supported: it was not surprizing that hypochondriacal persons should believe themselves transformed into wolves, and should dream of eating young children, but what shall we think of the judges who burnt them, on the strength of those confessions, and registered their trials as solemn precedents? On this occasion, the unwary avowal of Bodinus should not be forgotten: we must be severe in punishing witches, says he,

* Hutchinson, p. 110, 111.

† P. 58. ‡ Wier p. 712.

for the populace would ſtone a magiſtrate who inclined to ſhew them mercy*.

The ſolemn meetings of witches are ſuppoſed to be put beyond all doubt, by the numerous confeſſions of criminals, who have deſcribed their ceremonies, named the times and places of meeting, and the perſons preſent, and who have agreed in their relations, though ſeparately delivered (N). But I would obſerve, firſt, that the circumſtances told of thoſe feſtivals are ridiculous and incredible in themſelves; for they are repreſented as gloomy and horrible, yet with a mixture of childiſh and extravagant fancies, more likely to diſguſt and alienate than to conciliate the minds of the gueſts. They have every appearance of uneaſy dreams; ſometimes the devil and his ſubjects *ſay maſs*, ſometimes he *preaches* to them, more commonly he was ſeen in form of a black goat, ſurrounded by imps in a thouſand frightful ſhapes; but none of theſe forms are *new*, they all reſemble known quadrupeds or reptiles. Secondly, I obſerve, that there is direct proof furniſhed even by demonologiſts†, that all theſe ſuppoſed journies and entertainments are nothing more than dreams. Perſons accuſed of witchcraft have been repeatedly watched, about the time which they had fixed for the meeting; they have been ſeen to

* Demonom. p. 317. † Hoffman in particular.

anoint

anoint themſelves with ſoporific compoſitions, after which they fell into profound ſleep, and on awaking ſeveral hours afterwards, they have related their journey through the air, their amuſement at the feſtival, and have named the perſons whom they ſaw there. In the inſtance told by Hoffman, the dreamer was chained to the floor. Common ſenſe would reſt ſatisfied here, but the enthuſiaſm of demonology has invented more than one theory to get rid of theſe untoward facts. Dr. Henry More, as was formerly mentioned, believed that the aſtral ſpirit only was carried away: other demonologiſts imagined that the witch was really removed to the place of meeting, but that a cacodemon was left in her room, as an εἴδωλον, to delude the ſpectators. Thirdly, ſome ſtories of the feſtivals are evidently tricks. Such is that related by Bodinus, with much gravity: a man is found in a Gentleman's cellar, and apprehended as a thief; he declares his wife had brought him thither to a witch-meeting, and on his pronouncing the name of God, ſhe and all her companions had vaniſhed, and left him incloſed. His wife is immediately ſeized, on this righteous evidence, and hanged, with ſeveral other perſons, named as preſent at the meeting.

4. It may ſtill farther confirm the preceding obſervations, if we remark that the ſucceſs of

all magical operations was ascribed to the innate confidence of the magician*. It was a common question among philosophers, in the last century, whether the imagination could move external objects, generally decided in the affirmative; the reality of demoniacal action, (the result of simple intelligence) was one of the strongest reasons for this determination. The wits might be expected to divert themselves with this enthusiastic philosophy: accordingly Ariosto reckons magical pursuits among those which prove destructive to reason;

> Altri in amor lo perde, altri in Onori;
> Altri in cercar, scorrendo il mar, richezze;
> Altri ne le Speranze di Signori;
> Altri dietro a le magiche sciocchezze.
>
> Cant. XXXIV. S. 85.

Rabelais makes very free with Agrippa's philosophical character, under the ludicrous name of Her Trippa; and in the Epistolæ Obscurorum Virorum, Ortuinus is made to retail some of the most ridiculous conceits that have found their way into magical books. But the most formidable enemy to those doctrines was our own Butler, who bent such a force of ridicule against them, as expelled them entirely from the higher

* By Paracelsus, (after Pomponatius and the Arabian physicians) Lord Verulam, Sylv. Sylvar. p. 206, and Fien. de Virib. Imaginat. p. 59.

ranks

ranks of men, among whom they were admitted before.

III. The remedies employed in diſeaſes ſuppoſed to be preternatural, may be divided into magical and natural. Of the firſt, the cure by pronouncing certain words, or verſes, is the moſt ancient; for the method by emblem, of which the brazen ſerpent, erected by Moſes, was the firſt example, was not magical, but miraculous. The former is generally termed the Homeric cure, becauſe the oldeſt inſtance of it is found in the Odyſſey: A diſſertation on this ſubject is aſcribed to Galen. Serenus thought it efficacious(o), as did Ætius, Pliny, Alexander Trallianus, Marcellus, Gordonius and Ferrerius. Antonius Benivenius relates that an arrow was drawn from a ſoldier's body, by a ſong. Celius Aurelianus had told that the Emperor Adrian cured a perſon of a dropſy, by reciting certain words*. Who can wonder, after theſe examples, at the conduct of Buchanan's Franciſcans?

> Conceptis verbis de ſomno ſurgere, menſam
> Ponere, adire, referre, jubere, orare, ſalutem
> Dicere, conceptis urinam reddere verbis.

A collection of ſome very ridiculous forms, for the cure of different diſeaſes, is furniſhed by Wierus†. Bodinus thought it very impious,

* Delrio Diſq. Magic. p. 48. Fien. de Virib. Imaginat. p. 92. † P. 376 de Curat. læſ. Malef.

and even blaſphemous, to print them. Certain plants, as I mentioned above, were ſuppoſed to exert remarkable properties, in conſequence of their ſignatures: Joſephus relates that he ſaw a certain Jew, named Eleazer, draw the devil out of an old woman's noſtrils, by the application of *Solomon's ſeal* to her noſe*, in preſence of the emperor Veſpaſian. The ſame author relates wonders of the herb Baaras, as Ælian does of the Cynoſpaſtus†, and different authors of the Mandragora.

Amulets form the principal part of magical remedies, but many amulets were not properly magical; thoſe compoſed of relicks, or of medicinal ſubſtances, muſt be exempted from this appellation. But, though they were remedies of the imagination only, it was generally believed that thoſe compoſed of characters were the produce of demoniacal compact, and therefore unlawful. During the greateſt part of the laſt century, it was very generally believed that a man might be rendered invulnerable by means of an amulet, and in the thirty years war, moſt of the officers wore one on duty‡. Some diſſertations on this ſubject may be found in the Miſcellanea Curioſa‖, the Acta Hafnienſia§, and ſomething in

* Wier. p. 415. † Id. p. 416.
‡ Harte's Prel. Diſc. to Guſt. Adolph.
‖ Tom. XII. § Tom. III.

Sennertus.

Sennertus. In the account of Gowrie's Conſpiracy, publiſhed by authority, one of the witneſſes ſolemnly depoſes, that after the Earl had received his mortal wound, he did not loſe a drop of blood, till an amulet was taken out of his pocket. In Germany, it was believed that muſkets might be charmed from firing: Dr. Clauderus, author of ſeveral eſſays in the Miſcellanea Curioſa, publiſhed on this uſeful art, under this title, De Impedienda Tormentorum Exploſione*. Naudé refuted this opinion in his book De Studio Militari. Moſt of the demonologiſts, however, follow St. Thomas in believing that thoſe characters, or particular ſubſtances, had no efficacy in themſelves, but were enjoined by the devil to the over-curious, as ſigns of convention, or tokens of ſubmiſſion†, of which laſt, he adds, the devils are very fond.

The origin of amulets was very remote; the Trojan Palladium is ſaid to have been compoſed of the bones of Abaris the Scythian, (the firſt aërial adventurer recorded in hiſtory) and thus was properly an amulet, in ſtructure as well as deſign.

Pomponatius ventured to aſſert, that all remedies of this ſort act on the imagination alone, and that a dog's bones would produce all the effects of the moſt venerated relics, if they were worſhip-

* Tom. XIV. † Delrio, Wierus, &c. &c.

ped

ped with an equal degree of confidence*. In this ſcepticiſm, however, he was countenanced only by the outrageous partiſans of the imagination, ſuch as Dr. Fienus of Antwerp.

The natural remedies, as might be expected, were thoſe adapted to hypochondriacal or hyſteric diſorders, as one or other of theſe was miſtaken for a poſſeſſion; when there was reaſon to ſuſpect impoſture in the fits, flagellation ſucceeded admirably. But many grave phyſicians employed even antiſpaſmodic and cathartic medicines, on the ſuppoſition of their exerting ſpecific powers, and almoſt every man had his favourite demonagogue. The herbaliſts always notice ſome plants for this purpoſe. Dr. Thoner extols *mercurius vitæ*, as remarkably uſeful in expelling preternatural ſubſtances from the body; but holding ſome other application neceſſary to extract the ſubſtance in which the *ſeminale principium* of the faſcination lodged (that is, the bewitched bread or apple offered the patient by the ſorcereſs) he applied, in the caſe treated by him, a cataplaſm ex ſtercore maleficiati†. Dr. Mynſicht cured ſeveral perſons bewitched, with aſafœtida applied in form of a plaſter, though Hofer, in his Hercules Medicus, doubts whether ſuch perſons can be cured by natural means‡. Two theories

* Fien. de Virib. Imaginat. p. 87, 192.

† Obſerv. p. 224. ‡ P. 452.

were

were advanced, to account for the action of aſafœtida in expelling demons; either that the devil thought himſelf inſulted by ſo vile an application, and quitted the patient with diſdain of his ill manners*, or that, as devils may be ſaid to have eyes and ears, it is very likely that they may have noſes alſo†. The thing was never fairly decided.

Such have been the perplexities of demonologiſts; perplexities which the fineſt talents were employed to clear up, without effect. As learning was freed from theſe clouds, they ſubſided among the vulgar, only to make way for ſucceeding illuſions, leſs fatal indeed, but not leſs ridiculous.

Both the theory and evidence of apparitions reſt on the ſame foundations with thoſe of witchcraft, for it is not ſuppoſed, by moſt of the philoſophical writers on this ſubject, that the ſouls of departed men ever reviſit this planet: they attribute all ſpectral phenomena either to angelic or diabolical operation. A full diſcuſſion of this, and all other queſtions relating to apparitions, may be found in a very common book, De Spectris, written in 1570, by Lavater, a theologiſt of Zurich‡.

The univerſal prevalence of this illuſion might be naturally expected, becauſe ſolitude and ſilence

* Thoner, p. 225. † Id. Ib.

‡ See particularly from p. 120 to 154, Leyden edition. Le Loyer, De L'Anchre, and many others have alſo written on apparitions.

will

will always produce apparitions. Vives wrote that ſpectres were daily beheld in America, on its firſt diſcovery, and Olaus Magnus deſcribes certain iſlands in the Norwegian ſeas, inhabited by ſpectres only, which often deceived the unwary ſailor Every inanimate object which could inſpire dread by its properties, or awe by its appearance, had its ſpirit (after the eſtabliſhment of Chriſtianity) which was believed to be uncommonly active during particular ſeaſons, when the obſervation of traditional ſuperſtitions diſpoſed the mind to receive an impreſſion of ſuch power more readily;

> When goblins haunt, from fire or fen,
> Or mine, or flood, the walks of men.
> COLLINS.

at other times, imbecility found reſt in the crowded devotions, and imagined holineſs of a feſtival:

> Some ſay that ever 'gainſt that ſeaſon comes,
> Wherein our Saviour's birth is celebrated,
> The bird of dawning ſingeth all night long:
> And then, they ſay, no ſpirit can walk abroad,
> The nights are wholeſome, then no planets ſtrike,
> No fairy talks, nor witch hath power to charm,
> So hallowed and ſo gracious is the time*.

Thoſe effects which we now aſcribe to the preſence of noxious airs in mines, were imputed

* Mr. Locke has aſſerted, that there is no more connection between darkneſs and an apparition, than between light and an apparition; without conſidering the defenceleſs ſtate, in which a perſon finds himſelf, in the dark.

with

with great confidence to the homines metallici, or demons of the mine; which is a good illuſtration of our principle(P). Whether the diminutive ſize of the fairies was inferred from the minute ſcale of the operations attributed to them, or was derived from the Platonic philoſophy, (for opinions, as they become obſolete with the learned, frequently deſcend to the crowd) their exiſtence was plainly aſſumed as an hypotheſis, to account for ſome appearances, the natural cauſes of which were unknown. Our poet is good authority here;

> Ye elves of hills, brooks, ſtanding lakes and groves,
> And ye, that on the ſands with printleſs foot,
> Do chaſe the ebbing Neptune, and do fly him
> When he comes back: you demy-puppets, that
> By moon-ſhine do the green-ſower ringlets make,
> Whereof the ewe not bites: and you whoſe paſtime
> Is to make midnight muſhrooms——

Philoſophy has not yet explained the production of the green-ſower ringlets in a ſatisfactory manner.

The proof of ſpectoral phænomena is reſted by all their defenders on *evidence*, and according to them, it is impoſſible to deny thoſe phænomena without deſtroying the foundation of all hiſtory. The apparition of Ficinus to Michael Mercato is a famous ſtory, and of great credit among ſpectral philoſophers; unluckily it came only

only from Mercato's grandſon. Bayle obſerves*; it was very unfortunate that Mercato did not make affidavit of the apparition, before a proper magiſtrate. Lord Clarendon's ſtory is quite deſtitute of ſupport, being a compound of hearſay and conjecture. The curious affair of the diſturbances in Cock-lane, never thoroughly believed, and never clearly detected, added no ſtrength to the doctrine of apparitions, but furniſhed another proof, that neither the force of natural talents, nor the helps of acquired knowledge, can eradicate the general diſpoſition to the engaging horrors of ſupernatural agency. Ventriloquiſm was talked of in this inſtance, but can only be regarded as a ſtill greater abſurdity (q).

Some of the beſt authenticated hiſtories of apparitions, however, carry their own detection with them, in the abſurdities eſtabliſhed by their evidence. In Baxter's World of Spirits, for example, there is a copious narrative of the diſturbances at Llanellin, in Glamorganſhire, confirmed by concurrent teſtimonies of ſufficient witneſſes, with this circumſtance among the reſt; that oft-times the *ſhadow* of a perſon walking would be viſible on the wall, while no ſubſtance capable of intercepting the ſun's rays was ſenſibly preſent in that place. This is a phyſical abſurdity, and cannot be true. But what ſhall

* Dict. Art. Bonet.

we

we make of the evidence? cry the ſpectral philoſophers. I would reply, that when men are once perſuaded that ſuch appearances *may* exiſt, they are very ready to impoſe on themſelves the belief that they *do* exiſt. This may be ſupported by a fact from the Duke of Berwick's Memoirs, of no remote date, but which could not be received on leſs authority than that of a great and good man. A French army encamped before Saragoſſa, in 1707, under the command of the Duke of Orleans; let us ſee what followed, in the words of our author, who was preſent. "The "Count de la Puebla, to retain the people of "Arragon in ſubjection as long as poſſible, and "by that means to retard the progreſs of the "Duke of Orleans, perſuaded the inhabitants "of Saragoſſa, that the reports of the march of "a freſh army, from Navarre, were falſe; and "*even that the camp which they ſaw was nothing real*, "but *only a phantom produced by magic*; in conſe- "quence of which, the clergy made a proceſſion "on the ramparts, *and from thence exorciſed the* "*pretended apparitions*. It is aſtoniſhing that the "people were ſo credulous as to entertain this "fancy, from which they were not undeceived "till the next day, when the Duke of Orleans's "light horſe having puſhed a guard of horſe, "of Puebla's, briſkly, to the very gates of the "city, cut off ſeveral of their heads there. Then "indeed the citizens were alarmed, and the

"magiſtrates

" magistrates appeared, to make their submission " to his Royal Highness. I could not have " believed what I have related, if I had not " been assured of its truth at Saragossa, by the " principal people of the city*." It seems the *ligature* of armies could no longer be performed, when this remarkable exorcism took place.

The principal writers on spirits, of this country, are Aubrey, More, Glanville, Baxter, Beaumont, and professor Sinclair, of Glasgow, to whom we must add Mr. Cumberland† a well-known living author, as the latest supporter of the doctrine among us, though he has produced only one history, and that of an old date (R).

It was mentioned before, that some spectral philosophers accounted for the phænomena of apparitions from demoniacal action, but it must be observed, that some believed those demons to be material; this was the opinion of Psellus‡; Paracelsus supposed the elements to be inhabited by four species of demons; spirits, nymphs, pygmies (our fairies) and salamanders; these he reckoned material, but of a different substance from man, that is, of the Caro non-adamica; Cudworth was inclined to think that angels were material; and Dr. Henry More was so much pressed with the difficulties which he found in reconciling the

* Memoires de Berwick, p. 398.

† Observer, No. 71. ‡ Cudworth's Int. Syst.

proposed

phænomena of ſpectres (in which he was a firm believer) with the immaterial ſyſtem, that he propoſed the hypotheſis of an immaterial extenſum*, a ſuppoſition which later metaphyſicians have found it convenient to adopt (T).

The preſent advanced period of the eighteenth century has produced a learned, an elegant, and what is ſtill more, a faſhionable theoriſt, in ſupport of the doctrine of apparitions; and this ſubject is perhaps to owe more to the *preſent* than to the *former* Lavater of Zurich. This writer, generally intereſting and inſtructive, often enthuſiaſtic, but always amiable, may poſſibly give a turn to the fortune of an opinion, which moſt perſons are rather anxious to deſtroy, than able to confute. Mr. Lavater applies, in ſome meaſure, the doctrine of the *tranſmiſſion of ſpirits* to the theory of ſpectral phænomena. *L'Imagination*, ſays he, *excitée par les deſirs de l'amour, ou echauffée par telle autre paſſion bien vive, opere dans des lieux et des temps eloignès*†. This is exactly the doctrine of Fienus, Lord Verulam, and other ſympathetic philoſophers of the laſt century. But Mr. Lavater has applied this poſition in a manner, I think, entirely new, in ſuppoſing that the imagination of a ſick or dying perſon, who longs to behold ſome abſent friend or relation, acts on the mind of this abſent perſon ſo ſtrongly, as to

* True notion of a ſpirit. † Phyſiog. tom. III. p. 163.

produce an idea of the preſence of the ſick or dying man. This will appear more clearly, and more advantageouſly, in his own words. *Un malade, un mourant, ou quelqu'un qui ſe trouve dans un peril imminent, ſoupire apres ſon ami abſent, apres ſon frere, ſes parens, ſon epouſe: ceux-ci ignorent ſa maladie, ſes dangers; ils ne penſent point a lui dans ce moment. Le Mourant, entraîné par l'ardeur de ſon imagination, perce a travers les murs, franchit les eſpaces, & aperoit dans ſa ſituation actuelle—en d'autres termes, il donne des ſignes de ſa preſence qui approchent de la realité. Une telle apparition eſt elle corporelle? rien moins que cela. Le malade, le mourant languit dans ſon lit, & ſon ami vogue peut-etre, en pleine ſanté, ſur une mer agitee: la preſence reelle devient par conſequent impoſſible. Qu'eſt-ce donc qui produit cette eſpece de manifeſtation? Quelle eſt la Cauſe qui agit dans l'eloignement de l'un, ſur les ſens, ſur la faculté viſuelle de l'autre? C'eſt l'imagination —l'imagination eperdue d'amour & de deſir—Concentreé, pour ainſi dire, dans le foyer de la paſſion**. This hypotheſis would explain other pretended appearances; the effects of an evil eye, the curſes of a longing woman, and the ſucceſs of the operations with waxen figures; but I do not ſee how it explains the apparitions of the dead, (for death terminates all bodily affections, *ultra, neque curæ neque gaudio locum*)—without having recourſe

* Id. Ib. p. 164.

to

to the other theories already mentioned. But if it be allowed, that the imagination of another can produce ſo wonderful an impreſſion on the mind, how much more eaſy is it to conceive a man's own imagination impoſing deluſions on him? There are many moments, when the operations of fancy are extremely fallacious in healthy men; and in nervous diſeaſes, where the patient appears but little altered in the ſtrength of his faculties, there is much tranſient delirium, and much falſe imagination. When the fancy is once ſet in motion, old impreſſions generally revive, and friends and relations ruſh upon us; the caprices of aſſociation in ſome perſons are unaccountable; and many may cry out with the poet*, *delirando io vivo.*

One cannot help regretting, that ſo much ingenuity and attention had not rather been applied to an accurate examination of facts, than to form theories, which only ſhew how irreconcileable thoſe facts are with reaſon and experience; but it has generally been found, that an opinion, adopted without ſufficient proof, is defended with an earneſtneſs very unfriendly to inveſtigation; and we are going to ſee ſuch aſtoniſhing perverſion of facts, and ſuch obſtinate adherence to the moſt extravagant abſurdities, that what has hitherto been related will

* Metaſtaſio.

appear, comparatively, to be wiſdom and diſcernment.

It is an opinion of conſiderable antiquity, that the bodies of deceaſed men were ſometimes reanimated by demons. The firſt accounts of this kind are to be found in Phlegon Trallianus*, and Philoſtratus Dioſcyles. A ridiculous ſtory to the ſame purpoſe, was circulated reſpecting Agrippa: one of his ſcholars, it was ſaid, got into his ſtudy, during his abſence, and taking up a book which contained the titles of certain demons, began to read: preſently a demon popped his head into the room and aſked what was required of him; perceiving the boy frightened, the impudent devil ſtrangled him on the ſpot. When Agrippa returned, he was, of courſe, a good deal vexed at the accident; however, with infinite addreſs, he ordered a demon to enter the body immediately, to walk once or twice round the market-place, and then to let the carcaſe drop, that the boy might appear to have died ſuddenly. A few other inſtances of the ſame kind may be picked out from the legendary writers, but it was not till the ſixteenth century, that the bodies reanimated were ſuppoſed to do any miſchief. Then, in Germany, Dr. Martin Weinrich, a collector of incredible hiſtories, publiſhed an account of two *Redivivi*; one was

* De Mirabilibus.

the

the ſhoe-maker of Breſlaw, the other was a man of conſequence, Cuntius, whoſe ſtory was lately tranſlated from Dr. More's Antidotus Adverſus Atheiſmum, and republiſhed in the Antiquarian Repertory. So troubleſome and inſolent was the revived ſhoe-maker, that the people whom he diſtreſſed, were on the point of leaving their houſes, to ſettle elſewhere(u).

Dr. More thought theſe narrations ſo convincing, that he concludes them in triumph with theſe words: *equidem fateor me tam tardo eſſe ingenio, ut comminiſci plané nequeam, quid hic Atheus excogitaturus ſit, in ſubterfugium ſibi et latibulum, contra tam manifeſtas evidentesque demonſtrationes.* When the good doctor calls the infidels with regard to apparitions, atheiſts, the reader may be apt to ſmile; but this frightful epithet was not, with him, an unmeaning term of reproach, as it is with ſo many perſons, in ordinary books, and in ordinary converſation; it was a concluſion from the doctor's ſyſtem, which he drew in a curious manner, though with abundance of zeal and confidence, at the cloſe of one of his ſections, in the performance juſt quoted; "as it is a maxim "in polity," ſaith he, "that, no Biſhop, no King, "ſo in metaphyſics, we may ſay, no Spirit, no "God."

Paracelſus found a ready theory in his philoſophy, for this ſpecies of reanimation; the devil, according to him, can do what he will in his

own kingdom, and he can preſerve a dead body for any length of time, by his knowledge of the true balſam. *Quod in Domino non moritur, moritur in diabolo. Jam vero divos in ſuo regno diabolus facere poteſt. Quibus rebus homo a putredine preſervetur, quovis homine exactius novit, utpote veri balſami gnarus**. (v)

This ſtrange deluſion prevailed very generally among the modern Greeks, and they knew the remedy for the diſturbance, which conſiſted in publicly burning the carcaſe of the *vroucolacas*, as they termed the *redivivus*. But the triumph of this abſurdity was reſerved for an advanced period of the eighteenth century. Somewhere about the year 1730, an alarm began in Hungary, of ſome houſes being haunted, by perſons deceaſed, who ſucked the blood of ſome of the family, during their ſleep. The ſufferers were ſenſible of this terrible operation, and commonly recognized the features of the apparition: the Hungarians termed theſe nocturnal viſitors, *Vampires*. In conſequence of theſe practices, the perſons ſucked became weak and emaciated, the corpſe of the Vampire, on the contrary, was found, even after long interment, freſh, florid, and full of blood; ſometimes to ſuch a degree, as to pour out blood from the noſe, mouth and ears. This extravagance, produced by the

* Philoſoph. Sagac. cap. X.

oppreſſive

oppreſſive dreams of plethoric perſons, on the eve of diſeaſe, was firſt publiſhed by the Marquis D'Argens, in the Jewiſh Letters; a ſtriking contraſt to his ſcepticiſm on ſome other points, but an inconſiſtence not uncommon with perſons deiſtically inclined. But the ſubject ſoon got into different hands, for the learned Dom Calmet, well known by his critical diſſertations on the Bible, publiſhed a hiſtory of Vampires, rich in abſurdity, of which the following paſſage is a ſpecimen, but it is neceſſary to add, quoted from Voltaire*. "In "Hungary, two officers, commiſſioned by the "Emperor Charles VI. aſſiſted by the bailiff of "the place, and the executioner, went to examine "a Vampire, who had been dead for *ſix weeks*, "and who ſucked the whole neighbourhood. "They found him in his coffin, freſh, lively, "with open eyes, and deſiring ſomething to eat. "The bailiff paſſed ſentence. The executioner "tore out the Vampire's heart, after which the "Vampire eat no more."

Some queſtions, apparently puzzling, occur on the ſubject of thoſe diſturbances: how could all the inhabitants of conſiderable towns be impoſed on, in a matter ſo nearly reſpecting the peace and ſafety of each individual, as univerſally to impute actions to ſupernatural influence, which perhaps were no more than knaviſh? How

* Queſt. ſur. L'Encyclop. Art. Vampire.

could they be deceived in the ſolemn and public inſpection of the Vampire's body, which always took place? And how could the deſtruction of a wretched carcaſe, long dead, become the means of reſtoring public tranquillity, ſo as to be ordered by the magiſtrates? The beſt explanation is, to ſhew, by unqueſtionable facts, how ſuch deluſions *have* taken place; this will alſo elucidate the nature of all the illuſions already mentioned. When Tournefort viſited the iſland of Mycone*, in 1701, the principal town, at which he reſided, was diſturbed by a *vroucolacas*, or *redivivus*; the conſternation was ſo great, that moſt of the inhabitants ſlept in tents, in the market-place: their peace was reſtored by burning the carcaſe of the *redivivus*, after a public examination, in which it was declared to be freſh. Theſe are the principal facts, and apparently ſtrong: now let us unveil their origin, by an abſtract of Tournefort's obſervations.

I. Tournefort obſerves, that the perſon accuſed of thoſe diſturbances had been quarrelſome during his life, and was murdered privately. So that he was a proper ſubject of ſuſpicion; ſuppoſing the general deluſion once eſtabliſhed.

II. The redivivus was accuſed of nothing which might not have been practiſed by ordinary vagabonds; "he was ſeen to walk in the night

* Letter III.

"with

" with great haſte; he tumbled about people's " goods, put out their lamps, &c." The wonders related of the German redivivi are only exaggerations.

III. The ſtory never gained full credit, till the papas, (prieſts) for their own honour and intereſt, took it up.

IV. During the examination at the chapel, the popular fury againſt the deceaſed carried every thing before it: " the corpſe ſtunk ſo of- " fenſively, that they were obliged to burn " frankincenſe; but the ſmoke mixing with the " exhalations from the carcaſe, increaſed the " ſtench, and began to affect the poor people's " brains. Their imaginations, ſtruck with the " ſpectacle before them, became full of viſions. " They fancied that a thick ſmoke aroſe out of " the body; we durſt not ſay it was the ſmoke " of the incenſe. They were inceſſantly bawling " out vroucolacas (βρυκολακας) **** Several peo- " ple preſent averred that the wretch's blood " was extremely red: the butcher ſwore the body " was ſtill warm **** Juſt at that inſtant came " in a flock of people, loudly proteſting they " plainly perceived that the body was not grown " ſtiff, when it was carried from the fields to " church, to be buried, and that conſequently " it was a true vroucolacas **** I do not doubt " but they would have ſworn it did not ſtink, " if we had not been there **** And for us,

" who

" who had got as cloſe to the corpſe as we could, " that we might be more exact in our obſer- " vations, we were almoſt poiſoned by the in- " tolerable ſtench that iſſued from it. When " they aſked us what we thought of this body," (every one knows that Tournefort was a phy- ſician) " we told them we believed it to be " thoroughly dead; but as we were willing to " cure, or at leaſt not to exaſperate their pre- " judiced imaginations, we repreſented to them, " that it was no wonder the butcher ſhould feel " a little warmth, when he groped among the " putrid inteſtines; that it was no extraordinary " thing for the body to emit fumes, ſince dung " turned up will do the ſame; that as for the " pretended redneſs of the blood, it ſtill ap- " peared, by the butcher's hands, to be nothing " but a very fœtid, naſty ſmear."

V. The devil took care to get into the cellars of thoſe perſons who abandoned their houſes, in order to drink up their wine.

VI. No watch was kept, nor any proper mea- ſures taken to prevent villanous practices.

Upon the whole then, the opinion of a vrou- colacas, like the others already examined, ap- pears to be only an hypotheſis, formed to ac- count for phænomena, whoſe cauſes were not obvious to the people. But if a philoſopher had not unluckily been preſent at this curious tranſ- action, the annals of credulity could ſcarce have furniſhed

furniſhed a ſtronger proof than this, of the exiſtence of redivivi, conſequently of all ſorts of demoniacal operations.

It ſeems alſo, that when men are unacquainted with the natural cauſe of a particular appearance, and at the ſame time, are perſuaded of the poſſibility of diabolical illuſions, they will impoſe even on their own ſenſes, to favour the admiſſion of a theory ſo intereſting to their imaginations.

The miracles of the Abbé Paris, while they afford the ſtrongeſt proof of this aſſertion, and while they ſhew that illuſions ſcarcely credible may prevail in the brighteſt periods of ſcience and art, require particular attention, as Mr. Hume has affected to compare them with the miracles of our religion; though they were refuted in publications of the time never much known, and now generally forgotten.

The report of theſe miracles began in 1727, ſoon after the death of the Abbé Paris, when different perſons ſuppoſed themſelves relieved from indiſpoſitions, by employing portions of his clothes, or of the bed on which he died, as relics. A concourſe of the diſeaſed, the ſuperſtitious, and the curious was made to his tomb, in the church-yard of St. Medard, at Paris, where miraculous cures and ſudden converſions were ſaid to take place every hour. But contact with the tomb produced a curious effect on many: they were thrown into convulſions, which

which continued till they thought fit to deſcend from their ſtation; and this appearance was ſo common, that the cures and converſions were comparatively little conſidered; the votaries of the Abbé Paris came to be known by the title of *Convulſioniſts*, and many perſons conſidered thoſe gambols as the only effect of the miraculous power. A collection of the moſt remarkable cures, ſtrengthened by the depoſitions of the friends and medical attendants of the patients, was drawn up by Mr. de Montgeron, a counſellor of the parliament, who had been converted at the tomb, and by him preſented to the King. The Archbiſhop of Paris oppoſed the authenticity of the miracles, but a report in favour of them was preſented to him, certified by twenty-three curés (Vicars) reſiding in Paris, two Biſhops declared for them, in the pulpit, and the Cardinal de Noailles ſupported them with his authority*.

The advocates for theſe miracles inſiſted chiefly on the curés: the convulſions were objected to them by their enemies, who conſidered them as demoniacal, which was allowed by ſome of the convulſioniſts themſelves†, as well as that ſome indecencies were exhibited at the tomb. One of the patients who was lame of the

* Priv. Life of Louis XV. Mirac. de M. de Paris. Verité des Mirac. Demontr. par Montg. Jewiſh Letters.

† Des Vœux, Nouvelles Lettres ſur les Mirac. p. 154.

left

left leg, was ſaid to have hurt the other by tumbling on the tomb, which gave riſe to an epigram by the Ducheſs de Maine;

Un decroteur a la Royale,
Du talon gauche eſtropié,
Obtint pour grace ſpeciale
D'etre boiteux de l'autre pié.

The infatuation continued, with increaſing force, almoſt five years, during which the controverſy was carried on ſo fiercely, as to occaſion ſeveral diviſions among the defenders of the miracles themſelves; ſuch as Auguſtiniſts, Vaillantiſts, Secouriſts, Diſcernants, Figuriſts, Melangiſts, &c.* names, ſays my author, worthy of a place with thoſe of Umbiliciſts, Iſcariotiſts, Stercoriſts, Indorſians, Orebites, Eonians, and other ſects equally illuſtrious. Government at length found it neceſſary to interpoſe; the tomb was blocked up and guarded, (for the Abbé Paris produced no miracle efficacious againſt a fixed bayonet) and Montgeron was impriſoned, very ſoon after preſenting his book. Theſe meaſures did not ſtop the controverſy, however, or diminiſh the credit of the miracles: Voltaire ſays, the latter continued for thirty years ſucceſſively.

It is eaſy to perceive, that this whole buſineſs was contrived to ſupport the party of the appellants, who oppoſed the Bull Unigenitus,

* Encycloped. Art. Convulſionnaires.

attempted

attempted to be forced at that time on the Gallican church. This may be collected from the writings of the party *, who made ample uſe of ſo excellent an argument, and who were not wanting, either in artifice or aſſurance, to carry on their deſign. They had more engines at work, than this of St. Medard; for ſimilar miracles were worked at the tomb of Mr. Rouſſe, an appellant alſo, who died at Avenay near Rheims, about the ſame time with Mr. de Paris †. The Janſeniſts certainly timed their operations well, for miracles were heard of in all places; the miraculous cure of Madame de la Foſſe; (which was believed previous to any examination ‡) that at Lyons, and that at Amſterdam, all happened about the ſame time. Theſe ſtories were noiſed about Paris, ſo that people were diſpoſed even to expect miracles in favour of the appellants: this is evident from the words of Mr. Le Gros, who was a writer for that party §; "that if miracles were neceſſary, they might be expected." And all the appellants were eager to declare, that the miracles at St. Medard were performed purpoſely to ſupport them in their opinions. If this cir-

* Particularly from the *Conſequences qui reſultent de ces miracles* in Montgeron's book.

† Mirac de M. L'Abbé de Paris, p. 118, & ſeq.

‡ Nouv. Lett. p. 190.

§ Nouv. Lett. p. 189.

cumſtance

cumſtance throws a doubt on thoſe operations, our ſuſpicions will increaſe, when Montgeron's own hiſtory of his converſion is conſidered. "I determined," ſays he*, "to go every day "to the tomb, to obſerve attentively whatever "ſhould occur, reſolving to believe nothing but "my own eyes; to take the name and reſidence "of every patient, to examine them carefully "myſelf, and to be informed accurately of the "nature of their complaints by conſulting their "medical attendants; in ſhort, to ſpare no trou- "ble, to diſcover whether a ſupernatural agency "was exerted at the tomb, or whether there was "any deceit. But perceiving at the firſt glance," he adds, "the attention, the penitence, and the "ardour expreſſed in the countenances of moſt "of thoſe who paid their devotions in that holy "place, I was ſtruck with an internal ſentiment "of reſpect, *never having ſeen any body pray ſo "fervently.* I fell on my knees, reſting my "elbows on the edge of the tomb."——And from the inſtant of this *ſentimental* converſion, it is evident that Mr. de Montgeron's teſtimony becomes of no value. But the matter does not reſt here. Mr. Des Vœux, paſtor of the French church at Dublin, in 1740 publiſhed *Nouvelles Lettres ſur les Miracles de M. Paris*, in which, by a painful examination of the facts, he convicted

* Mirac. de Converſ. p. 10, 11.

Montegron

Montgeron of falſe citations *, of ſuppreſſing paſſages unfavourable to his opinion, and of directly miſrepreſenting facts. Nay it appeared that ſome perſons, ſaid to have been cured miraculouſly, retracted every thing that they had advanced: and there were ſuch proofs given of tampering with witneſſes, to make them ſign what they at leaſt did not know to be true †, and of attempts to deceive the medical perſons whoſe atteſtations were required, as muſt deſtroy every degree of credit that the advocates for thoſe miracles might otherwiſe deſerve.

A miraculous cure, publiſhed in the Nouvelles Eccleſiaſtiques, was proved to be a forgery ‡: after this detection, the conteſt was heard of no more, and the influence of the philoſophical party increaſed to ſuch a degree, that it was preſumed the age would now be ſecure from the phrenzy of the moſt ſpecious deluſion. However, in 1778, Dr. Meſmer began to diſtinguiſh himſelf by his operations in *animal magnetiſm*, which ſoon became as famous as the miracles of the holy deacon of St. Medard. Paris was the theatre of this wonder-worker (for it ſeems Philoſophy, like the Romans, can only be defeated in its own quarters) and as it was not immediately known,

* Lett. VI.

† In Anne le Franc's Caſe, letter VII.

‡ Des Vœux, lett. VII.

that

that Dr. Meſmer's opinions were chiefly borrowed from the exploded hypotheſis of Van Helmont, he drew a ſufficient concourſe of patients to his houſe, to attract the attention of government. A committee of perſons, well known by their philoſophical publications, was appointed to examine the merits of this pretended diſcovery, and their inquiries, which it is unneceſſary to repeat in this place, as they may be found in all the periodical publications*, terminated in this concluſion, "that animal magnetiſm is a mere chimæra." In fact, whatever may have been the operator's opinion, it is evident that the patients were acted upon by the force of imagination alone, which, however, produced very violent effects, evidently hyſterical in the female patients, whom the commiſſioners obſerved to be more generally affected than thoſe of the other ſex. When the practice was no longer permitted in Paris, it found ſhelter in the capital of this country, where, though the operations are ſomewhat varied, facts are not wanting to prove that the principle is ſtill the ſame.

The preſſure of human evils ſubjects the mind to ſurprizing acts of weakneſs, in its attempts to procure conſolation or relief: perhaps the moſt remarkable of theſe is that confidence, ſo frequently repoſed, for the cure of diſeaſes, in the natural

* Particularly a very diſtinct abridg. in the Europ. Mag. for Nov. 1784.

virtues and properties of the body of a man, labouring under the ſame defects, and ſuſceptible of the ſame infirmities, with thoſe who fancy themſelves relieved by his touch. However, this deluſion is not confined to the vulgar of all times, or to the inſtance before us; it has been patronized by the moſt reſpectable writers, and reigned for a conſiderable time in philoſophy. The cures performed by Apollonius, which reſt on the ſingle evidence of Philoſtratus, have been long given up as fabulous, though ſome of the early chriſtians had the indiſcretion to allow the facts, and then to account for them from demoniacal operations; but the philoſophic hiſtorian, Tacitus, relates a ſtory of this kind, which ought to make his declamatory admirers more modeſt in their praiſes of his veracity. While Veſpaſian reſided at Alexandria, he was ſuddenly endued with the power of working miracles, *multa miracula evenere, quibus cœleſtis favor, et quædam in Imperatorem inclinatio Numinum oſtenſa eſt.* A blind man fell at his feet, beſeeching him to touch his cheeks and eyes with his imperial ſpittle: another perſon lame of one hand *(manu æger)* begged to be honoured with a kick *(ut pede ac veſtigio Cæſaris calcaretur)* both perſuaded by the authority of Serapis that theſe operations would remove their diſorders. Veſpaſian ſuffered himſelf to be importuned, and then referred the matter to his phyſicians, who knew very well what to anſwer;

id

id fortasse curæ diis, & divino Ministerio Principis lectum; accordingly the Emperor spits on one of his petitioners, and kicks the other, and both are cured on the spot*. Strada observes very properly, on this disgraceful story, that there was room enough here for Tacitus to have exercised his talent at conjecture, which he indulges so freely on other subjects; but this perhaps was too easily to be explained, because Apollonius, who was the friend of Vespasian, *happened* to be in Alexandria, at the time of this miracle, and it was readily enough conceived that the Emperor might be his pupil†. The sage historian, therefore, relates the simple matter of fact. Delrio and Morhoff mention the Saludadores of Spain, who cured diseases by the touch, breath, saliva, &c. Morhoff says that Emanuel de Valle de Moura wrote an express treatise concerning them. Another Spaniard, Michael Medina, knew a boy who cured diseased persons by touching them‡. Dr. Willis asserts that he has known scrophulous persons cured, by imposition of hands by the *seventh son of a seventh son*, when all other remedies failed‖. The efficacy of the royal touch, in England, was not only asserted by Tooker and Willis, but by Wiseman, whose Treatise on Surgery was the standard book in this country,

* Histor. lib. IV. † Prolus. II. Histor. p. 71, & seq.

‡ Fien. p. 193; Delrio 24. ‖ Cereb. Anat. p. 159.

till the publication of Dr. Heister's, and by Morhoff, in his Princeps Medicus, where he asserts the operation to be miraculous. Wiseman declares expressly, that some of the worst scrophulous cases he had ever met with, yielded to this remedy.

Van Helmont was the principal supporter of that opinion which supposed a magnetic spirit in the human body, by action on which he explained all the phænomena of disease, and all the facts of demonology. Other philosophers contented themselves with believing, in general, that those appearances, and particularly in the cure of disorders, depended on an emanation or transmission of spirits, and it was thought that even the faculties and affections of the mind could be thus transmitted. This was the opinion of Bacon*, and the foundation of that expression of the poet:

> - - - - - - Spirits are not finely touch'd,
> But to fine issues. - - - - - - - -

In consequence of this, it was supposed that the sympathy which had subsisted among the parts of an individual, continued after the separation of those parts: hence the cure by sympathy, that is, without application to the parts affected. Lord Verulam alledges his own experience of this method: "The taking away of warts," says he,

* Sylv. Sylvar. Cent. X.

"by

" by rubbing them with ſomewhat that after-
" wards is put to waſte and conſume, is a com-
" mon experiment; and I do apprehend it the
" rather, becauſe of mine own experience. I had
" from my childhood a wart upon one of my
" fingers: afterwards when I was about ſixteen
" years old, being then at Paris, there grew upon
" both my hands a number of warts (at the leaſt
" an hundred) in a month's ſpace. The Eng-
" liſh Ambaſſador's Lady, who was a woman far
" from ſuperſtition, told me one day, ſhe would
" help me away with my warts; whereupon ſhe
" got a piece of lard with the ſkin on, and rub-
" bed the warts all over with the fat ſide, and
" amongſt the reſt, that wart which I had had
" from my childhood; then ſhe nailed the piece
" of lard, with the fat towards the ſun, upon a
" poſt of her chamber window, which was to the
" ſouth. The ſucceſs was, that within five
" weeks ſpace, all the warts went quite away;
" and that wart which I had ſo long endured for
" company. But at the reſt I did little marvel,
" becauſe they came in a ſhort time, and might go
" away in ſhort time again; but the going away
" of that which had ſtayed ſo long, doth yet ſtick
" with me. They ſay the like is done by the
" the rubbing of warts with a green elder ſtick,
" and then burying the ſtick to rot in muck*."
Thus far the great Lord Verulam. Upon this

* Ib. p. 216.

principle*, inſtead of applying ſalve to a wound, it was applied to the ſword which inflicted the injury. Butler did not let this folly eſcape: he ſays of Sidrophel

> He had a ſympathetic powder
> That wounds nine miles point-blank would ſolder.

Willis and Dr. Boulton were both ſympathiſts.

The moſt curious inſtance of ſympathy that has occurred to me, is contained in a paper of the Miſcellanea Curioſa (tom. XIV.) A carpenter cut down a tree which grew in the neighbourhood of a gibbet, where a famous thief had been ſuſpended for a conſiderable time. When the workman came to ſplit the trunk, he was aſtoniſhed to find, in the very centre of the wood, an exact repreſentation of the gibbet and the malefactor, which remained fair on each ſide, after he had accompliſhed the diviſion. He carried one of the impreſſions to the philoſopher in his neighbourhood, who gratified the learned ſociety with this ſingular inſtance of ſympathy, and the account was publiſhed with two very accurate engravings, to ſatisfy the reader more completely.

The laſt ſympathiſt and healer by touch, previous to Dr. Meſmer (excepting Leverett, mentioned in the account before referred to) was

* Sir Kenelm Digby, Rattray, and others wrote on this ſubject.

Greatrack,

Greatrack, whoſe cures were related by Mr. Boyle, and mentioned by Dr. More, in his preface to the Saduciſmus Triumphatus, as atteſted by ſeveral Fellows of the Royal Society: a relation of his cures was publiſhed in the Philoſophical Tranſactions, No. 256. Theſe were the fore-runners of animal magnetiſm, which, after all, probably owed ſomewhat of its favourable reception, to the ſtrange faculty of diſcovering ſubterraneous water, attributed about the ſame time to Bleton; and animal magnetiſm would, perhaps, have acquired as ſtrong a party, if it had been unchecked by authority, as any deluſion with which we reproach the ruder ſtates of ſociety. For ſuch is the credulous tendency of the mind, that even the preſent century, notwithſtanding the boaſted improvements of reaſon, has proved fruitful in illuſions of the moſt ridiculous nature; nor is it eaſy to limit the future progreſs of ſimilar phrenzies, when we conſider that at this moment, there is a ſet of perſons among us, who, contrary to all reaſon and experience, are firmly perſuaded that they ſhall never die*. (y)

The doctrine of animal magnetiſm is ſo notoriouſly an hypotheſis, formed to explain real or pretended appearances, that it is unneceſſary to ſhew its agreement with the general principle. There would be no great difficulty in proving, if it were worth while, that the ſame talents

* The Buchanites. See the Divine Dictionary, paſſim.

which might have been harmleſsly employed in compoſing a rebus or a paraphraſe, have produced very ſerious perplexities by their application to philoſophy. At leaſt nobody will diſpute, that the theoriſt as well as the poet, may be often ſaid to

> - - - - - - Give to airy nothing
> A local habitation and a name.

The contemplation of literary abſurdity is far from being vain or uſeleſs; on the contrary it is an indiſpenſable object, to every one who wiſhes to make a proper uſe of books. To be convinced of this, we need only to caſt our eyes, on the productions of thoſe men who extract, without doubting, from writers of eminence; where the underſtanding is ſhocked by lies of long deſcent, and blunders of venerable antiquity; where the author is ſatisfied with having made up a *juſtum volumen*, and the reader is content, for his own ſake, to miſtake knowledge of books for knowledge of things.

Demonologiſts have always aſſerted, that it is impoſſible to weaken the credit of their facts without deſtroying the foundations of hiſtory; and it is certain, that the abundant evidence produced in ſupport of manifeſt contradictions, and phyſical impoſſibilities, tends to leſſen our confidence in hiſtorical narrations. But when we inveſtigate demonological facts a little more cloſely, when we trace the ſame hiſtory through many

many writers, who copy it from each other, or from an original of little authority, their real number is found to be ſmall, and of theſe few, the greater part has been proved to be fallacious. From the denial of thoſe facts, therefore, nothing can be concluded to the injury of hiſtory, however cautious a reader may become, by obſerving in what manner the ſame facts are altered, by undergoing the ſucceſſive efforts of men differing in abilities and diſpoſitions. He may even be tempted to believe, that he diſcovers the foundation of many recorded enormities, in the paſſions and weakneſſes of the hiſtorian: for ſome men ſee their own darling vice in all others, as ſome gouty phyſicians diſcover the gout, in every patient who comes under their care.

Laſtly, an acquaintance with the hiſtories and arguments of demonologiſts produces an uſeful heſitation, in aſſenting to evidence, however ſpecious; for in doubtful caſes, however numerous the witneſſes may be, it will always be remembered, how frequently men have ſhewed themſelves determined, to ſee and believe things inviſible and incredible.

NOTES.

NOTES.

(A) Page 26. The Romans had a temple dedicated to the Goddeſs Fever; an inſcription has been found, addreſſed to that divinity—FEBRI DIVÆ, FEBRI SANCTÆ. We have ſeen in our times, *Eloges de la Fievre Quartaine.*

(B) p. 27. Though Ariſtotle endeavours to account for dreams in general from natural cauſes, yet he admits their production in ſome caſes by ſupernatural agency. All dreams, ſays he, are not of divine origin, becauſe many of the lower animals dream; but though there be nothing divine, there may be ſomething demoniacal in them. De Divin. per Somn. C. II.

(C) p. 27. This was done as a joke. The augurs told him that the chickens would not eat, which was conſidered as a bad omen: they ſhall drink then, replied Claudius, and ordered them to be thrown overboard. Others of the Romans laughed at this mode of divination. Cato wondered that one augur could look at another without laughing. Hannibal's keen ſarcaſm affected both Pruſias, (when he was deterred from fighting by the auſpices) and the art itſelf. "Would you rather," ſaid he, "truſt a calf's liver than a veteran commander?"

(D) p. 28. Auguſtus was ſhamefully ſuperſtitious; he not only obſerved the time of year when his dreams were leaſt favourable and moſt uncertain, but on a certain day of every year, in conſequence of a viſion, he begged publicly, ſtretching out his hand, ſays Suetonius, to thoſe who reached him a few *aſſes*. Suet. in Aug. § 91.

The ſame author preſerves a very ingenious explanation of an omen which terrified the Emperor. A flaſh of lightning

ning effaced the letter C, from the inſcription of a ſtatue of Auguſtus. The augurs declared that he would ſurvive this ſign only an hundred days, the number denoted by C, and that he ſhould be received among the gods, becauſe Æſar the remaining part of the word, denoted a god in the Etruſcan language. Id. § 97.

(E) p. 32. See the *Cry from the Deſart*, and *Prophetical Warnings of the eternal Spirit by the mouth of his ſervant John Lacy*. There is a well known ſtory of this man, who was firſt the protector of thoſe viſionaries, and afterwards a prophet himſelf; that when ſome of them were taken up, he went to the ſolicitor general, and told him that the Lord commanded him by his mouth to grant a *Noli Proſequi* in favour of his ſervants: the Lord knows very well, replied the ſolicitor general, that it is not in my power to grant a *Noli Proſequi*.

(F) p. 35. Perhaps this is not quite exact, for I quote Martin from memory, and the reſemblance between Virgil and him may be cloſer. Virgil, we ſee, owned that his prieſt *dreamed*, but according to Martin, *his* friend was ſuppoſed to be awake.

(G) p. 43. Butler ridicules this among other magical doctrines, in Hudibras's conference with Sydrophel.

> Th' intelligible world, he knew
> And all men dream on't, to be true;
> That in this world there's not a wart,
> That has not there a counterpart;
> For can there on the face of ground,
> An individual beard be found,
> That has not, in a foreign nation,
> A fellow of the ſelf-ſame faſhion;
> So cut, ſo colour'd, and ſo curl'd,
> As thoſe are in th' inferior world?

He

He has characterized Agrippa rather too strongly, if the fourth book of the Occult Philosophy be spurious;

> Sir Agrippa, for profound
> And solid lying much renown'd. C. I.

(H) p. 46. Wierus had a controversy with a clergyman of Stutgard, named *Brentius*, on the subject of hail-storms. Brentius had advanced, in a sermon printed in Wierus's *Liber Apologeticus*, that although witches did not cause hail by their own power, (for he believed it to be of diabolical origin) and although the devil imposed on them, by making them believe *that* to be performed at their desire, which he should do at any rate, yet they were objects of punishment, because they had consented to the mischief. Wierus replied very properly, that the law did not judge of intentions, but of facts: Brentius rejoined that the consent of a witch to the devil's exciting a hail-storm, was a *conatus perfectus*, which Wierus denied. The peasants continued to apprehend and procure the condemnation of witches, whenever their hay was damaged by hail. Observe the inconsistency of human reason: A person who has the power of raising violent storms, of darting the thunderbolt, and overturning the dwellings of men, cannot rescue herself from the hands of a petty constable.

(I) p. 50. It appears from Lucian's original story of *the ass*, that ointments were in use among the supposed Grecian witches, in order to their conveyance to the witch-meetings. Apuleius has improved so far upon him, in the story of the murdered bladders, (which Cervantes borrowed for Don Quixote) that the ass of the Greek must give place.

(K) p. 51. In 1695, Richard Dugdale was said to have given his soul to the devil, that he might become the best dancer in Lancashire, but the fraudulent demon affected him with convulsions. Some *ministers* who attended him held

held very curious dialogues with him. Dr. Hutchinson furnishes the following specimen of their judicious raillery. "What, Satan! is this the dancing, that Richard gave "himself to thee for? Canst thou dance no better? "Ransack the old records of past times, and places in thy "memory: canst thou not there find out some better way "of trampling? Pump thine invention dry: cannot that "universal seed plot of subtle wiles and stratagems "spring up one new method of cutting capers? Is this "the top of skill and pride, to shuffle feet and brandish "knees thus, and to trip like a doe, and skip like a "squirrel? And wherein differ thy leapings from the "hoppings of a frog, or bouncings of a goat, or friskings "of a dog, or gesticulations of a monkey? And cannot "a palsy shake such a loose leg as that? Dost thou not "twirl like a calf that has the turn, and twitch up thy "houghs just like a spring-hault tit?"

Hutchinson, p. 162.

(L) p. 55. Possessions frequently spread in monasteries, like hysterical complaints, and there appears in reality no distinction between them, in such cases. See Wierus *de Maleficio affectis*, (p. 299, & seq.) where one very grievous symptom is taken notice of; *Si quando hæ in arreptam matulam mejere tentarent, ea violenter erepta, lotio conspurcabant lectum.* It was in 1634, under the administration of Cardinal Richlieu, that the hysterics of the nuns of Loudun occasioned the execution of Urban Grandier. The Duke of Lauderdale has left his testimony to the bungling performance of this deception, in Baxter's Essay on Spirits. Of several physicians who examined the possessed, Dr. Duncan of Saumur was the only one who had the discernment or the courage to declare that there was nothing preternatural in their disease. He proved his assertion by some publications, the heads of which may be seen in the *Causes Celebres*, but as it was very well known that the devil had spoke Latin, his reasons were disregarded.

and

and Grandier was burnt alive. When this unfortunate man was led to execution, a bee was observed to fly about his head; this was supposed to be his *familiar*.

(M) p. 62. Baxter gives two instances of a judge examining, from the bench, whether a poor illiterate creature could repeat the Lord's prayer: it was proved, according to this author, that a witch cannot rehearse it without blundering.

(O) p. 71. Serenus is supposed to have invented the famous Abracadabra. Wier. p. 406.

(N) p. 68. There is a grave relation in Delrio, of a witch being shot flying, by a Spanish centinel, at the bridge of Nieulet, near Calais, after that place was taken by the Spaniards. The soldier saw a black cloud advancing rapidly, from which voices issued; when it came near he fired into it; immediately a witch dropped. This is *undoubted proof of* the meetings! Disq. Mag. p. 708.

(P) p. 77. Van Helmont, Bodinus, Strozza and Luther imputed thunder and meteors to the devil.

(Q) p. 78. St. Augustine supposes the prophetess, mentioned in the sixteenth chapter of the Acts of the Apostles, to have been a Ventriloquist, without any apparent foundation. The Pythia at Delphi was supposed to be a Ventriloquist, receiving inspiration from certain fissures in the earth, as Cicero informs us (a doctrine of which Swift has made great use). *In Mulieribus*, says Wierus, (p. 140) *Sonus horum vaticiniorum ex genitalibus partibus edebatur et audiebatur.* The same author adds, *Quin et Tertullianus, auctor gravissimus, affirmat se ventri loquas vidisse fœminas, e quarum pudendis vocula quædam dum sedebantur excitabatur, respondebatque scisscitantibus. Denique Celius Ludovicus, patrum nostrorum memoria fœminam se ventriloquam crebro vidisse Rhodii, Italiæ urbe & patria sua, scribit: ex cujus pudendis vocem immundi*

spiritus

spiritus pertenuem quidem, sed tamen prorsus intelligibilem, sæpe audierit, de rebus præteritis aut præsentibus mirificam: at de futuris plerumque incertam, sæpe etiam vanam & mendacem!— Our modern ventriloquists no longer pretend to the gift of prophecy, but they possess the extraordinary power of directing articulate sounds, so as to produce an appearance of their issuing from any object within the compass of the voice. I do not find that any one attempts to teach this curious art.

From the surprizing deceptions produced by ventriloquism many persons have hoped to explain the facts of demonology; but the talent seems to be rare, and every witchmonger cannot command an operator at pleasure. In the affair of Cock-lane I think the supposition unsatisfactory, because I have never heard that ventriloquists could imitate knocking and scratching by the voice alone.

Diderot appears to have taken the idea of his *Bijoux indiscrets* from Tertullian's εγγαστριμυθοι.

(R) p. 80. Dee's Conferences with Spirits.] Those visions were evidently designed, by a train of indecency, to accomplish a community of wives between Kelly and Dee; an event which took place after solemn invocations of the Deity for his blessing on this connection, supernaturally ordained, and after the strongest expressions of piety by all parties. This, it must be seen, destroys the credit of the book. I find Dr. Dee in the list of the Wardens of Manchester. Probably he did not pass for a conjurer before his preferment.

(T) p. 81. Addison's and Blackstone's faith in apparitions was gratuitous, and perhaps more ridiculous than that of the stoutest demonologists. Those great men believed the possibility, and even the reality of such phenomena, without crediting any particular instance. Upon this

this plan there is nothing incredible. Reject the evidence of others, and our own experience, as unneceſſary to influence our belief, and what principle remains to determine us?

(U) p. 85. It is aſtoniſhing to obſerve how far human pride has carried its claims to ſupernatural influence. Every man, whoſe mind was more reſtleſs than uſual, believed himſelf to be aſſiſted by a genius, and this word, which at preſent only denotes a certain activity of intellect, ſignified, for a long time, the action of an inviſible and ſuperior being. There were geniuſes of cities and kingdoms, as well as of men. In the laſt century, it was very common to ſay, when a great man gave way unexpectedly to oppoſition, that his genius was over-awed by that of another. Such expreſſions in Clarendon and others of that time, were not figurative, but implyed the ſuperior vigour of the imagination, or (in Lord Verulam's language) *of the tranſmitted ſpirits*, in one perſon over another. Every one knows the noble reply made by the Marechale D'Ancre, on her trial, when ſhe was accuſed of ſorcery, on account of her influence over the Queen-Mother. The Romans perhaps carried this extravagance beyond all ancient nations, in ſuppoſing a particular divinity to preſide over almoſt every natural action; (although our aſtrologers are equal with them, in aſſigning a planet to govern every member of the body) they had however the wonderful good fortune to make their ſuperſtition inſtrumental in preſerving order in the ſtate, and courage in the army; an art which has not deſcended to their poſterity, although they retain an ample ſhare of the *means*. For Petronius's Bon Mot reſpecting the Neapolitans does not appear unjuſt, even at this diſtance: *noſtra regio tam plena eſt numinibus, ut facilius poſſis Deum quam hominem invenire.*

(V) p. 86. A very extraordinary hiſtory of the regeneration of a thief, was publiſhed, by a grave phyſician, in the

the Miſcellanea Curioſa. A malefactor was executed, of whoſe body the doctor got poſſeſſion for the purpoſe of diſſection. After diſpoſing of the other parts of the body, he ordered his Aſſiſtant to pulverize part of the cranium, which was a remedy at that time admitted in diſpenſatories. The powder was left in paper, on the table of the muſeum, where the aſſiſtant ſlept. About midnight he was awaked by a noiſe in the room, which obliged him to riſe immediately: the noiſe continued about the table, without any viſible agent, and at length he traced it to the powder, in the midſt of which he now beheld, to his unſpeakable diſmay, a ſmall head with open eyes ſtaring at him; preſently two branches appeared, which formed into the arms and hands; then the ribs became viſible, which were ſoon clothed with muſcles and integuments; next, the lower extremities ſprouted out, and when they appeared perfect, the puppet, (for his ſize was ſmall) reared himſelf on his feet; inſtantly his clothes came upon him, and he appeared in the very cloak he wore at his execution. The affrighted ſpectator, who ſtood hitherto mumbling his prayers with great application, now thought of nothing but making his eſcape from the revived ruffian; but this was impoſſible; for the apparition planted himſelf in his way, and after divers fierce looks and threatening geſtures—opened the door and went out. No doubt the powder was miſſing next day.

This ſtory was publiſhed by a ſociety under the imperial protection, during the age of Louis XIV.

(X) p. 85. The moſt curious hypotheſis on this ſubject is that of Marcus Marci, worthy to rank with the ειδωλα of Democritus, and Dr. More's Immaterial Extenſum. Marci was a phyſician and imperial counſellor at Prague, who held that ideas are ſubſtantial, and may inhere in the conſtituent atoms of their ſubject, although its organization be deſtroyed. Thus ſpectres and redivivi were explained, without any other difficulty than that of believing

the theory. It was a queſtion among philoſophers of the laſt century, how the raining of frogs could be explained; for that frogs were rained nobody preſumed to doubt, before Rhedi. Marci roundly affirmed that the *ideas* of frogs were brought down by the rain, and that they put on a covering of mud, after their deſcent. This rain of ideas is a thought that would have been much celebrated in a poet. Sterne has hit on ſomething like it, but the congelation of words, which furniſhes the ſubject of two very amuſing papers in the Tatler, is a ſtretch of fancy capable of making any poet's fortune. What additional reaſon, ſince the time of Cicero, for that obſervation, *nihil tam abſurdè dici poſſit, quod non dicatur ab aliquo philoſophorum!* That ſingular and beautiful appearance, the Fata Morgana, was a happy confirmation of Marci's hypotheſis. He ſuppoſed it to conſiſt of the ideas of dead animals.

Dr. King, in his uſeful Tranſactions, takes notice of a ſhower of fiſhes, in Kent, recorded in No. 243 of the Philoſophical Tranſactions.

(Y) p. 103. When this paragraph was written, the author did not expect to find his ſentiments ſo ſpeedily confirmed, by the public performance of a ſolemn exorciſm, in one of the firſt cities of this kingdom. On the thirteenth of June, 1788, George Lukins of Yatton in Somerſetſhire, was exorciſed in the temple church, at Briſtol, and delivered from the poſſeſſion of ſeven devils, by the efforts of ſeven clergymen. An account of his deliverance was publiſhed in ſeveral of the public papers, authenticated by the Rev. Mr. Eaſterbrook, vicar of the temple church in Briſtol, from which I extract a few particulars.

Lukins was firſt attacked by a kind of epileptic fit, when he was going about acting Chriſtmas plays, or mummeries: this he aſcribed to a blow given by an inviſible hand. He was afterwards ſeized by fits, during which, he declared with a roaring voice that he was the devil, and ſung different ſongs in a variety of keys. The fits always began

began and ended with a ſtrong agitation of the right hand. He frequently uttered dreadful execrations during the fits. The whole duration of his diſorder was eighteen years.

At length, viz. in June 1788, he declared that he was poſſeſſed by ſeven devils, and could only be freed by the prayers *(in faith)* of ſeven clergymen. Accordingly the requiſite force was ſummoned, and the patient ſung, ſwore, laughed, and barked, and treated the company with a ludicrous parody on the *Te Deum*. Theſe aſtoniſhing ſymptoms reſiſted both hymns and prayers, till a *ſmall, faint voice* admoniſhed the miniſters to adjure. The ſpirits, after ſome murmuring, yielded to the adjuration, and the happy patient returned thanks for his wonderful cure. It is remarkable, that during this ſolemn mockery, the fiend ſwore "by his infernal den," that he would not quit his patient; an oath, I believe, no where to be found but in the Pilgrim's Progreſs, from which Lukins probably got it.

Very ſoon after the firſt relation of this ſtory was publiſhed, a perſon, well acquainted with Lukins, took the trouble of undeceiving the public with regard to his pretended diſorder, in a plain, ſenſible narrative of his conduct. He aſſerts that Lukins's firſt ſeizure was nothing elſe than a fit of drunkenneſs; that he always foretold his fits, and remained ſenſible during their continuance; that he frequently ſaw Lukins in his fits, "in every one of which, "except in ſinging, he performed not more than moſt "active young people can eaſily do;" that he was detected in an impoſture with reſpect to the clenching of his hands; that after money had been collected for him, he got very ſuddenly well; that he never had any fits while he was in St. George's Hoſpital, in London; nor when viſitors were excluded from his lodgings, by deſire of the author of the Narrative; and that he was particularly careful never to hurt himſelf by his exertions during the paroxyſm.

Is it for the credit of this philoſophical age, that ſo bungling an impoſture ſhould deceive ſeven clergymen

into a public act of exorcism? This would not have passed even on the authors of the *Malleus Maleficarum*, for they required signs of supernatural agency, such as the suspension of the possessed in the air, without any visible support, or the use of different languages, unknown to the demoniac in his natural state.

Manserunt, hodieque manent vestigia ruris.

Letter *on* Attraction *and* Repulsion; *communicated by Dr.* Percival, *October* 11, 1786.

DEAR SIR,

I SHALL think myself honoured by your communication of the following experiments and observations to the Manchester Literary Society, if you think them worth their attention.

THE waving motion of oil and water contained in a glass suspended and vibrated in strings, may be accounted for without considering any repulsion or difference of gravity between the two fluids. To prove whether a greater difference of specific weight would increase the motion, I tried quicksilver and water, and found that in this case no waving motion was perceptible. I then tried milk and water, whose

whose weights are nearly alike; also water tinged with cochineal at the bottom, and clear water above; and observed that the motion in these was at least as great as that of the oil and water. This led me to suspect that water alone would move in the same manner, and to make the motion perceptible, I dropped into the glass some powdered yellow ochre during its vibration, which following the agitation of the water, rendered it plainly visible. The glass was then tied to a slip of wood, by which means I could move it with greater velocity in the same arc: this caused the waving motion to be so strong as to make the water roll higher on one side of the surface than the other. Lastly, a cylinder of wood was suspended by its axis in a bent wire, and the vibration caused a motion similar to that of the fluids.

From these experiments, I conclude that the waving motion is produced by the difference of velocity of the lower and higher parts of the fluid, the higher endeavouring to return sooner than the lower. The higher part of the fluid may be considered as the ball of a shorter pendulum than the lower, and the fluidity of the water, or oil, enables its several parts to move as freely as the cylinder of wood which rolls upon its axis, because the center of gravity and of oscillation do not coincide. The principle is thus explained in Enfield's Institutes of Natural

" Philosophy; it is easy to conceive that in a pen-
" dulum there must be some one point, on each
" side of which, the momenta of the several parts
" of the pendulum will be equal, or in which
" the whole gravity might be collected without
" altering the time of its vibrations. This
" point, which is called the center of oscil-
" lation, is different from the center of gra-
" vity: for if a plane, perpendicular to the string
" of the pendulum, be conceived to pass through
" the center of the ball, bisecting it, the velo-
" city of the lower half, and consequently its
" momentum, will in vibration be greater than
" that of the upper half: consequently, the cen-
" ter of oscillation must be lower than the center
" of gravity; and a plane passing through the
" center of oscillation will divide the ball into
" two unequal parts, so that the greater quan-
" tity of matter above it shall compensate for
" the greater velocity below it, and the mo-
" menta on each side be equal. If the pen-
" dulum be an inflexible rod, every where of
" equal size, it is found that the distance of
" the center of oscillation from the point of
" suspension is two thirds of the length of the
" rod. If, whilst a pendulum is in motion, it
" meets with an obstacle at its center of oscilla-
" tion sufficient to stop it, the whole motion
" of the pendulum will cease at once without
" any jarring: for the obstacle resists equal

" momenta

"momenta above and below this point." Now gravitation, which is the obstacle to the above-mentioned vibrating cylinder, acts upon its axis; and because the lower half has more volocity which is not counterbalanced by quantity of matter above, a waving motion is produced. The reason that the upper surface remains parallel to the top of the glass is, because a body revolving about a center has a tendency to recede from that center, so that a glass may be revolved in a plane perpendicular to the horizon without losing any of the water. And unless the waving motion when the glass is vibrated be very violent, it cannot overcome the difference of specific weight so as to cause an undulation of the upper surface, as appears by the experiment of quicksilver and water, where the weight of the quicksilver, compared with water, renders its waving motion on the surface as imperceptible as that of the water or oil, having air only in the upper part of the glass.

Drops of water rolling over the leaves of colewort are prevented from adhering to the surface by a blue powder, which covers the leaves of that and various other plants, for if the powder be wiped off the water will adhere. The leaves of honey-suckles and barbery trees are blue on one side only, and the water adheres to the green side and not to the blue. If the sur-

face of a pond be struck with a stick, numerous globules of water roll over without breaking, whilst they pass several yards from the place where the water was struck. In these cases of apparent repulsion I suppose that every drop of water surrounded with air becomes globular by the cohesion of its own particles, and unless its weight or contact with other surfaces be sufficient to overcome its cohesion, and displace the air adhering both to the drop and to the surface which it falls upon, it retains its form and cannot unite with them.

Soap bubbles will roll over or rebound from a carpet, though they be filled with smoke, which makes them heavier than when blown with clear air. Also pins may be thrust through them, and even the small end of a tobacco pipe, so as to blow a smaller bubble within the larger without its immediately breaking: but if a bubble fall upon a smooth plain surface, it instantly breaks.

I have sometimes been amused with blowing bubbles with inflammable air, and by attaching to them a small circle of paper and fine thread or raw silk, could hold them suspended in the air for a considerable time. Another amusing experiment was to fix to the inflammable air-bubble a small slip of nitred paper, to the side of which and near the top a grain of gun-powder was annexed. The small end of the paper

paper was lighted, and burning up to the gunpowder during its ascent, it exploded, and at the same instant fired the inflammable air.

Two corks, or other light bodies, swimming on water, and having been previously moistened, seem to attract each other. The same thing happens if they are not moistened, but they depress the surface of the water by lying upon it when the water does not wholly adhere to them: but if one be moist and the other dry, they recede from each other; and if a dry one be driven against the side of the vessel containing the water, it is repelled in a manner very much resembling the reaction of elastic bodies. In both the cases where the corks approach towards each other, the surface of the water is raised or depressed by the adhesion of a circle of water to the cork, which also attracts other particles till the gravitation and cohesion are equally balanced as in capillary tubes; and when these circles of attracted water meet, and that in parallel situations, they attract each other, and uniting, endeavour to form one circle, as two bubbles or drops of water unite and form one larger; this brings the corks together, which would also unite and form one larger cork were they not prevented by the strength of cohesion between their own particles. But when one raises and the other depresses the water, each cork attracts its

its water from the level surface to complete its circle, the level surface being nearer to each circle than they are to each other, and which may be attracted without either elevating the one or depressing the other. This water, therefore, comes between and pushes them asunder.

In these instances, repulsion is accounted for by the attraction of intervening fluids, and perhaps the elasticity of the air, electricity, and all other elastic fluids may be explained in the same manner, that is, by supposing the mixture of a system of fluids of which some are capable of permeating glass and other solids, as light, heat, magnetism, &c. so that when air for instance is condensed in a vessel, the finer fluids are forced through the sides, and suffer the particles of air to approach nearer together. Or if the electrical fluid is forced upon one surface of glass, a finer fluid or system of finer fluids, which constitute its elasticity, are pressed out and rarify the other uninsulated surface: but without new and decisive experiments, this hypothesis will not be easily adopted. "Yet, if theory can be so framed "as really to suit all the facts, it has all the "evidence of truth that the nature of things can "admit. And even very lame and imperfect "theories are sufficient to suggest useful experi- "ments, which serve to correct those theories, "and give birth to others more perfect."

This

This quotation, from ſo great an authority as Dr. Prieſtley, furniſhes an excellent apology for the imperfect attempts of

DEAR SIR,

Your moſt obedient humble Servant,

A. BENNET,
CURATE of WIRKSWORTH.

WIRKSWORTH,
AUGUST 22, 1786.

ESSAY *on the* DRAMATIC WRITINGS *of* MASSINGER. *By* JOHN FERRIAR, M. D.

MANCHESTER, OCTOBER 25, 1786.

- - - - - - Res antiquæ laudis et artis
Ingredior, ſanctos auſus recludere fontes.
VIRG.

IT might be urged, as a proof of our poſſeſſing a ſuperfluity of good Plays in our language, that one of our beſt dramatic writers is very generally diſregarded. But whatever concluſion may be drawn from this fact, it will not be eaſy to free the public from the ſuſpicion of caprice, while it continues to idolize Shakeſpeare, and to neglect an author not often much inferior,

inferior, and ſometimes nearly equal to that wonderful poet. Maſſinger's fate has indeed been hard, far beyond the common topics of the infelicity of genius. He was not merely denied the fortune for which he laboured, and the fame which he merited; a ſtill more cruel circumſtance has attended his productions: literary pilferers have built their reputation on his obſcurity, and the popularity of their ſtolen beauties has diverted the public attention from the excellent original.

An attempt was made in favour of this injured poet, in 1761, by a new edition of his works, attended with a critical diſſertation on the old Engliſh Dramatiſts, in which, though compoſed with ſpirit and elegance, there is little to be found reſpecting Maſſinger. Another edition appeared in 1773, but the poet remained unexamined. Perhaps Maſſinger is ſtill unfortunate in his vindicator.

The ſame irregularity of plot, and diſregard of rules, appear in Maſſinger's productions, as in thoſe of his cotemporaries. On this ſubject, Shakeſpeare has been ſo well defended, that it is unneceſſary to add any arguments in vindication of our poet. There is every reaſon to ſuppoſe, that Maſſinger did not neglect the ancient rules from ignorance, for he appears to be one of our moſt learned writers (notwithſtanding the

inſipid

inſipid ſneer of Anthony Wood*;) and Cartwright, who was confeſſedly a man of great erudition, is not more attentive to the unities, than any other poet of that age. But our author, like Shakeſpeare, wrote for bread: it appears, from different parts of his works†, that much of his life had paſſed in ſlaviſh dependence, and penury is not apt to encourage a deſire of fame.

One obſervation, however, may be riſked, on our irregular and regular plays; that the former are more pleaſing to the taſte, and the latter to the underſtanding: readers muſt determine, then, whether it is better to feel, or to approve. Maſſinger's dramatic art is too great, to allow a faint ſenſe of propriety to dwell on the mind, in peruſing his pieces; he inflames or ſooths, excites the ſtrongeſt terror, or the ſofteſt pity, with all the energy and power of a true poet.

But if we muſt admit, that an irregular plot ſubjects a writer to peculiar diſadvantages, the force of Maſſinger's genius will appear more evidently, from this very conceſſion. The intereſt of his pieces is, for the moſt part, ſtrong and well defined; the ſtory, though worked up to a ſtudied intricacy, is, in general, reſolved with as much eaſe and probability as its nature will per-

* Athenæ Oxon. vol. I.

† See particularly the Dedication of the Maid of Honour, and Great Duke of Florence.

mit;

mit; attention is never diſguſted by anticipation, nor tortured with unneceſſary delay. Theſe characters are applicable to moſt of Maſſinger's own productions; but in thoſe which he wrote jointly with other dramatiſts, the intereſt is often weakened, by incidents, which that age permitted, but which the preſent would not endure. Thus, in the Renegado*, the honour of Paulina is preſerved from the brutality of her Turkiſh maſter, by the influence of a relic, which ſhe wears on her breaſt: in the Virgin Martyr, the heroine is attended, through all her ſufferings, by an angel diſguiſed as her page; her perſecutor is urged on to deſtroy her, by an attendant fiend, alſo in diſguiſe†. Here our anxiety for the diſtreſſed, and our hatred of the wicked, are completely ſtifled, and we are more eaſily affected by ſome burleſque paſſages which follow, in the ſame legendary ſtrain. In the laſt quoted play, the

* This Play was written by Maſſinger alone.

† The idea of devil-ſervants is not new in Engliſh literature. Giraldus Cambrenſis, in his Deſcription of Wales, mentions a gentleman, named Stakepool, in the county of Pembroke, who had a demon in diſguiſe for his ſteward. He was a faithful, diligent devil *(bonus œconomus)* and his only peculiarity was that he never went to church. Another demon, leſs conſcientious, attached himſelf to an Archbiſhop *(in Dacia,* ſaith Giraldus, *noſtris diebus)* under the form of a clergyman, and was a particular favourite of the good Prelate, till he accidentally betrayed himſelf. Cambdeni Angl. Normann. &c. Hiſt. p. 835.

attendant

attendant angel picks the pockets of two debauchees, and Theophilus overcomes the devil by means of a croſs, compoſed of flowers which Dorothea had ſent him from paradiſe.

The ſtory of the Bondman is more intricate than that of the Duke of Milan, yet the former is a more intereſting play; for in the latter, the motives of Franciſco's conduct, which occaſions the diſtreſs of the piece, are only diſcloſed in narration, at the beginning of the fifth act: we therefore conſider him, till that moment, as a man abſurdly and unnaturally vicious: but in the Bondman, we have frequent glimpſes of a concealed ſplendour in the character of Piſander, which keep our attention fixed, and exalt our expectation of the cataſtrophe. A more ſtriking compariſon might be inſtituted between the Fatal Dowry of our author, and Rowe's copy of it in his Fair Penitent; but this is very fully and judiciouſly done, by the author of the Obſerver*, who has proved ſufficiently, that the intereſt of the Fair Penitent is much weakened, by throwing into narration what Maſſinger had forcibly repreſented on the ſtage. Yet Rowe's play is rendered much more regular by the alteration. Farquhar's Inconſtant, which is taken from our author's Guardian, and Fletcher's Wild-gooſe Chace, is conſiderably leſs

* No. 88, 89, 90.

elegant

elegant and leſs intereſting, by the plagiary's indiſcretion; the lively, facetious Durazzo of Maſſinger is transformed into a nauſeous buffoon, in the character of Old Mirabel.

The art and judgment with which our poet conducts his incidents are every where admirable. In the Duke of Milan, our pity for Marcelia would inſpire a deteſtation of all the other characters, if ſhe did not facilitate her ruin by the indulgence of an exceſſive pride. In the Bondman, Cleora would be deſpicable when ſhe changes her lover, if Leoſthenes had not rendered himſelf unworthy of her, by a mean jealouſy. The violence of Almira's paſſion, in the Very Woman, prepares us for its decay. Many detached ſcenes in theſe pieces poſſeſs uncommon beauties of incident and ſituation. Of this kind, are the interview between Charles V. and Sforza*, which, though notoriouſly contrary to true hiſtory, and very deficient in the repreſentation of the Emperor, arreſts our attention, and awakens our feelings in the ſtrongeſt manner; the conference of Matthias and Baptiſta, when Sophia's virtue becomes ſuſpected†; the pleadings in the Fatal Dowry, reſpecting the funeral rites of Charolois; the interview between Don John, diſguiſed as a ſlave, and his miſtreſs,

* Duke of Milan, Act II. † Picture.

to

to whom he relates his ſtory*; but, above all, the meeting of Piſander and Cleora†, after he has excited the revolt of the ſlaves, in order to get her within his power. Theſe ſcenes are eminently diſtinguiſhed by their novelty, correctneſs, and intereſt; the moſt minute critic will find little wanting, and the lover of truth and nature can ſuffer nothing to be taken away.

It is no reproach of our author, that the foundation of ſeveral, perhaps all of his plots may be traced in different hiſtorians or novelliſts; for in ſupplying himſelf from theſe ſources, he followed the practice of the age. Shakeſpeare, Johnſon, and the reſt, are not more original, in this reſpect, than our poet; if Cartwright may be exempted, he is the only exception to this remark. As the minds of an audience, unacquainted with the models of antiquity, could only be affected by immediate application to their paſſions, our old writers crowded as many incidents, and of as perplexing a nature as poſſible, into their works, to ſupport anxiety and expectation to their utmoſt height. In our reformed tragic ſchool, our pleaſure ariſes from the contemplation of the writer's art; and inſtead of eagerly watching for the unfolding of the plot, (the imagination being left at liberty by the ſimplicity of the action,) we conſider

* A Very Woman. † Bondman.

whether it be properly conducted. Another reaſon, however, may be aſſigned for the intricacy of thoſe plots, namely, the prevailing taſte for the manners and writings of Italy. During the whole of the ſixteenth, and part of the ſeventeenth century, Italy was the ſeat of elegance and arts, which the other European nations had begun to admire, but not to imitate. From cauſes which it would be foreign to the preſent purpoſe to enumerate, the Italian writers abounded in complicated and intereſting ſtories, which were eagerly ſeized by a people not well qualified for invention*; but the richneſs, variety and diſtinctneſs of character which our writers added to thoſe tales, conferred beauties on them which charm us at this hour, however diſguiſed by the alterations of manners and language.

Exact diſcrimination and conſiſtency of character appear in all Maſſinger's productions; ſometimes, indeed, the intereſt of the play ſuffers by his ſcrupulous attention to them. Thus, in the Fatal Dowry, Charolois's fortitude and determined ſenſe of honour are carried to a moſt unfeeling and barbarous degree; and Franciſco's villainy, in the Duke of Milan, is cold and con-

* Cartwright and Congreve, who reſemble each other ſtrongly in ſome remarkable circumſtances, are almoſt our only dramatiſts who have any claim to originality in their plots.

ſiderate

ſiderate beyond nature. But here we muſt again plead the ſaid neceſſity under which our poet laboured, of pleaſing his audience at any rate. It was the prevailing opinion, that the characters ought to approach towards each other, as little as poſſible. This was termed *art*, and in conſequence of this, as Dr. Hurd obſerves*, ſome writers of that time have founded their characters on abſtract ideas, inſtead of copying from real life. Thoſe delicate and beautiful ſhades of manners, which we admire in Shakeſpeare, were reckoned inaccuracies by his cotemporaries. Thus Cartwright ſays, in his verſes to Fletcher, ſpeaking of Shakeſpeare, whom he undervalues, "*nature was all his art.*"

General manners muſt always influence the ſtage; unhappily, the manners of Maſſinger's age were pedantic. Yet it muſt be allowed that our author's characters are leſs abſtract than thoſe of Johnſon or Cartwright, and that, with more dignity, they are equally natural with thoſe of Fletcher. His conceptions are, for the moſt part, juſt and noble. We have a fine inſtance of this in the character of Diocleſian, who, very differently from the ranting tyrants, by whom the ſtage has been ſo long poſſeſſed, is generous to his vanquiſhed enemies, and perſecutes from policy as much as from Zeal. He attracts our

* Eſſay on the Provinces of the Drama.

reſpect, immediately on his appearance, by the following ſentiments;

> - - - - - - - - In all growing empires,
> E'en cruelty is uſeful; ſome muſt ſuffer,
> And be ſet up examples, to ſtrike terror
> In others, tho' far off; but when a ſtate
> Is rais'd to her perfection, and her baſes
> Too firm to ſhrink or yield, we may uſe mercy,
> And do't with ſafety. VIRGIN MARTYR, Act I.

Sforza is an elevated character, caſt in a different mould: brave, frank and generous, he is hurried, by the unreſtrained force of his paſſions, into fatal exceſſes in love and friendſhip. He appears with great dignity before the Emperor, on whoſe mercy he is thrown, by the defeat of his allies, the French, at the battle of Pavia. After recounting his obligations to Francis, he proceeds,

> - - - - - - If then, to be grateful
> For courteſies receiv'd, or not to leave
> A friend in his neceſſity, be a crime
> Amongſt you Spaniards - - - - - - - -
> - - - - - - - - - - - - - - Sforza brings his head
> To pay the forfeit. Nor come I as a ſlave,
> Pinion'd and fetter'd, in a ſqualid weed,
> Falling before thy feet, kneeling and howling
> For a foreſtall'd remiſſion: that were poor,
> And would but ſhame thy victory; for conqueſt
> Over baſe foes, is a captivity,
> And not a triumph. I ne'er fear'd to die,
> More than I wiſh'd to live. When I had reach'd
> My ends in being a Duke, I wore theſe robes,
> This crown upon my head, and to my ſide
> This ſword was girt: and witneſs truth, that now
> 'Tis in another's power when I ſhall part

With

With them and life together, I'm the ſame:
My veins did not then ſwell with pride, nor now
They ſhrink with fear.

DUKE OF MILAN, Act III. Sc. 2.

In the ſcene where Sforza enjoins Franciſco to diſpatch Marcelia, in caſe of the Emperor's proceeding to extremities againſt him, the poet has given him a ſtrong expreſſion of horror at his own purpoſe. After diſpoſing Franciſco to obey his commands without reſerve, by recapitulating the favours conferred on him, Sforza proceeds to impreſs him with the blackeſt view of the intended deed;

- - - - - - - - - - - - Thou muſt ſwear it,
And put into thy oath all joys and torments,
That fright the wicked, or confirm the good,
Not to conceal it only, (that is nothing)
But whenſoe'er my will ſhall ſpeak, ſtrike now,
To fall upon't like thunder.
- -
- - - - - - - - - - - - - - Thou muſt do
What no malevolent ſtar will dare to look on,
It is ſo wicked: for which men will curſe thee,
For being the inſtrument, and the bleſt angels
Forſake me at my need, for being the author:
For 'tis a deed of night, of night, Franciſco,
In which the memory of all good actions
We can pretend to, ſhall be buried quick;
Or, if we be remember'd, it ſhall be
To fright poſterity by our example,
That have outgone all precedents of villains
That were before us. Ib. Act. I. Sc. ult.

If we compare this ſcene, and eſpecially the paſſage quoted, with the celebrated ſcene be-

tween King John and Hubert, we ſhall perceive this remarkable difference; that Sforza, while he propoſes to his brother-in-law and favourite, the eventual murder of his wife, whom he idolizes, is conſiſtent and determined; his mind is filled with the horror of the deed, but borne to the execution of it by the impulſe of an extravagant and fantaſtic delicacy: John, who is actuated ſolely by the deſire of removing his rival in the crown, not only fears to communicate his purpoſe to Hubert, though he perceives him to be,

> A fellow by the hand of nature mark'd,
> Quoted, and ſign'd to do a deed of ſhame;

But after he has ſounded him, and found him ready to execute whatever he can propoſe, he only hints at the deed. Sforza enlarges on the cruelty and atrocity of his deſign; John is afraid to utter *his*, in the view of the ſun: nay, the ſanguinary Richard heſitates in propoſing the murder of his nephews to Buckingham. In this inſtance then, as well as that of Charolois, our poet may ſeem to deviate from nature, for ambition is a ſtronger paſſion than love, yet Sforza decides with more promptneſs and confidence than either of Shakeſpeare's characters. We muſt conſider, however, that timidity and irreſolution are characteriſtics of John, and that Richard's heſitation appears to be aſſumed, only in order to transfer the guilt and odium of the action to Buckingham.

It

It was hinted before, that the character of Piſander, in the Bondman, is more intereſting than that of Sforza. His virtues, ſo unſuitable to the character of a ſlave, the boldneſs of his deſigns, and the ſteadineſs of his courage, excite attention and anxiety in the moſt powerful manner. He is perfectly conſiſtent, and, though lightly ſhaded with chivalry, is not deficient in nature or paſſion. Leoſthenes is alſo the child of nature, whom perhaps we trace in ſome later jealous characters. Cleora is finely drawn, but to the preſent age, perhaps, appears rather too maſculine: the exhibition of characters which ſhould wear an unalterable charm, in their fineſt and almoſt inſenſible touches, was peculiar to the prophetic genius of Shakeſpeare*. Maſſinger has given a ſtrong proof of his genius, by introducing in a different play, a ſimilar character, in a like ſituation to that of Piſander, yet with ſufficient diſcrimination of manners and incident: I mean Don John, in the Very Woman, who, like Piſander, gains his miſtreſs's heart, under the diſguiſe of a ſlave. Don John is a model of magnanimity, ſuperior to Cato, becauſe he is free from pedantry and oſtentation. I believe he may be regarded as an original charac-

* If Maſſinger formed the ſingular character of Sir Giles Over-reach from his own imagination, what ſhould we think of his ſegacity, who have ſeen this poetical phantom realized in our days? Its apparent extravagance required his ſupport.

ter. It was eaſy to intereſt our feelings for all the characters already deſcribed, but no writer, before Maſſinger, had attempted to make a player the hero of tragedy. This, however, he has executed, with ſurprizing addreſs, in the Roman Actor. It muſt be confeſſed that Paris, the actor, owes much of his dignity to incidents: at the opening of the play, he defends his profeſſion ſucceſsfully before the ſenate; this artful introduction raiſes him in our ideas, above the level of his ſituation, for the poet has "graced him with all the power of words;" the Empreſs's paſſion for him places him in a ſtill more diſtinguiſhed light, and he meets his death from the hand of the Emperor himſelf, in a mock-play. It is, perhaps, from a ſenſe of the difficulty of exalting Paris's character, and of the dexterity requiſite to fix the attention of the audience on it, that Maſſinger ſays, in the dedication of this play, that "he ever held "it the moſt perfect birth of his Minerva." I know not whether it is owing to deſign, or to want of art, that Romont, in the Fatal Dowry, intereſts us as much as Charolois, the hero. If Charolois ſurrenders his liberty to procure funeral rites for his father, Romont previouſly provokes the court to impriſon him, by ſpeaking with too much animation in the cauſe of his friend. Romont, though inſulted by Charolois who diſcredits his report of Beaumellé's infidelity

lity, flies to him with all the eagerneſs of attachment, when Charolois is involved in difficulties by the murder of Novalle and his wife, and revenges his death when he is aſſaſſinated by Pontalier. Rowe, who neglected the fineſt parts of this tragedy in his plagiariſm, (the Fair Penitent) has not failed to copy the fault I have pointed out. His Horatio is a much finer character than his Altamont, yet he is but a puppet when compared with Maſſinger's Romont. Camiola, the Maid of Honour, is a moſt delightful character; her fidelity, generoſity, dignity of manners and elevation of ſentiments, are finely diſplayed, and nobly ſuſtained throughout. It is pity that the poet thought himſelf obliged to debaſe all the other characters in the piece, in order to exalt her. There is an admirable portrait of Old Malefort, in that extravagant compoſition, the Unnatural Combat. The poet ſeems to equal the art of the writer whom he here imitates;

> ---------- I have known him
> From his firſt youth, but never yet obſerv'd
> In all the paſſages of his life and fortunes,
> Virtues ſo mix'd with vices. Valiant the world ſpeaks him,
> But with that bloody; liberal in his gifts;
> But, to maintain his prodigal expence,
> A fierce extortioner; an impotent lover
> Of women for a flaſh, but, his fires quench'd,
> Hating as deadly. ------

Almira

Almira and Cardenes, in the Very Woman, are copied from nature, and therefore never obſolete. They appear, like many favourite characters in our preſent comedy, amiable in their tempers, and warm in their attachments, but capricious, and impatient of controul. Maſſinger, with unuſual charity, has introduced a phyſician in a reſpectable point of view, in this play. We are agreeably intereſted in Durazzo *, who has all the good nature of Terence's Micio, with more ſpirit. His Picture of Country Sports may be viewed with delight even by thoſe who might not reliſh the reality.

> ---------- Riſe before the ſun,
> Then make a breakfaſt of the morning-dew.
> Serv'd up by nature on ſome graſſy hill;
> You'll find it Nectar.

In the City Madam, we are preſented with the character of a finiſhed hypocrite, but ſo artfully drawn, that he appears to be rather governed by external circumſtances, to which he adapts himſelf, than to act, like Moliere's Tartuffe, from a formal ſyſtem of wickedneſs. His humility and benevolence, while he appears as a ruined man, and as his brother's ſervant, are evidently produced by the preſſure of his misfortunes, and he diſcovers a tameneſs amidſt the inſults of his relations that indicates an inherent baſeneſs of

* The Guardian.

diſpoſition.

diſpoſition*.—When he is informed that his brother has retired from the world, and has left him his immenſe fortune, he ſeems at firſt to apprehend a deception.

> - - - - - - - - - - O my Lord!
> This heap of wealth which you poſſeſs me of,
> Which to a worldly man had been a bleſſing,
> And to the meſſenger might with juſtice challenge
> A kind of adoration, is to me
> A curſe, I cannot thank you for; and much leſs
> Rejoice in that tranquillity of mind,
> My brother's vows muſt purchaſe. I have made
> A dear exchange with him. He now enjoys
> My peace and poverty, the trouble of
> His wealth conferr'd on me, and *that* a burden
> Too heavy for my weak ſhoulders. Act III. Sc. 2.

On receiving the will, he begins to promiſe unbounded lenity to his ſervants, and makes profeſſions and promiſes to the Ladies who uſed him ſo cruelly in his adverſity, which appear at laſt to be ironical, though they take them to be ſincere. He does not diſplay himſelf till he has viſited his wealth, the ſight of which dazzles and aſtoniſhes him ſo far as to throw him off his guard, and to render him inſolent. Maſſinger diſplays a knowledge of man not very uſual with dramatic writers, while he repreſents the ſame perſon as prodigal of a ſmall fortune in his youth, ſervile and hypocritical in his diſtreſſes, arbitrary and rapacious, in the poſſeſſion of wealth ſud-

* See particularly his Soliloquy, Act III. Sc. 2.

denly

denly acquired: for thoſe ſeeming changes of character depend on the ſame diſpoſition variouſly influenced; I mean, on a baſe and feeble mind, incapable of reſiſting the power of external circumſtances. In order, however, to prepare us for the extravagances of this character, after he is enriched, the poet delineates his exceſſive tranſports on viewing his wealth, in a ſpeech which cannot be injured by a compariſon with any ſoliloquy in our language.

'Twas no fantaſtic object, but a truth,
A real truth, no dream. I did not ſlumber,
And could wake ever, with a brooding eye
To gaze upon't. It did endure the touch,
I ſaw and felt it. Yet what I beheld
And handled oft, did ſo tranſcend belief,
(My wonder and aſtoniſhment paſs'd o'er)
I faintly could give credit to my ſenſes.
Thou dumb magician [the Key] that without a charm
Didſt make my entrance eaſy, to poſſeſs
What wiſe men wiſh and toil for; Hermes, Moly,
Sybillas' golden bough, the great elixir,
Imagin'd only by the alchemiſt,
Compar'd with thee are ſhadows; thou the ſubſtance
And guardian of felicity. No marvel
My brother made thy place of reſt his boſom,
Thou being the keeper of his heart, a miſtreſs
To be hugg'd ever. In bye corners of
This ſacred room, ſilver in bags heap'd up,
Like billets ſaw'd and ready for the fire,
Unworthy to hold fellowſhip with bright gold
That flow'd about the room, conceal'd itſelf.
There needs no artificial light, the ſplendour
Makes a perpetual day there, night and darkneſs

By

By that ſtill-burning lamp for ever baniſh'd.
But when, guided by that, my eyes had made
Diſcovery of the caſkets, and they open'd,
Each ſparkling diamond from itſelf ſhot up
A pyramid of flames, and in the roof
Fix'd it a glorious ſtar, and made the place
Heav'n's abſtract or epitome, rubies, ſapphires,
And ropes of orient pearl; theſe ſeen, I could not
But look on gold with contempt. And yet I found
(What weak credulity could have no faith in)
A treaſure far exceeding theſe. Here lay
A manor bound faſt in a ſkin of parchment,
The wax continuing hard, the acres melting.
Here a ſure deed of gift for a market town,
If not redeem'd this day, which is not in
The unthrift's power. There being ſcarce one ſhire
In Wales or England, where my monies are not
Lent out at uſury, the certain hook
To draw in more. I am ſublim'd! groſs earth
Supports me not. I walk on air! Who's there?
[*ſeeing ſtrangers*]
Thieves! raiſe the ſtreet! Thieves!

It was a great effort by which ſuch a train of violent emotions, and beautiful images was drawn, with the ſtricteſt propriety, from the indulgence of a paſſion to which other poets can only give intereſt in its anxieties and diſappointments. Every ſentiment in this fine ſoliloquy is touched with the hand of a maſter; the ſpeaker, overcome by the ſplendour of his acquiſitions, can ſcarcely perſuade himſelf that the event is real; "it is no fantaſy, but a truth; a real truth, no dream; he does not ſlumber;" the

the natural language of one who ſtrives to convince himſelf that he is fortunate beyond all probable expectation; for "he could wake ever to gaze upon his treaſure:" again he reverts to his aſſurances; "it did endure the touch; he ſaw and felt it." Theſe broken exclamations and anxious repetitions are the pure voice of nature. Recovering from his aſtoniſhment, his mind dilates with the value of his poſſeſſions, and the poet finely directs the whole gratitude of this mean character to the key of his ſtores. In the deſcription which follows, there is a ſtriking climax in ſordid luxury; that paſſage where

> Each ſparkling diamond from itſelf ſhot forth
> A pyramid of flames, and in the roof
> Fix'd it a glorious ſtar, and made the place
> Heav'n's abſtract or epitome;

though founded on a falſe idea in natural hiſtory, long ſince exploded, is amply excuſed by the ſingular and beautiful image which it preſents. The contemplation of his enormous wealth, ſtill amplified by his fancy, tranſports him at length to a degree of frenzy, and now ſeeing ſtrangers approach, he cannot conceive them to come upon any deſign but that of robbing him, and with the appeaſing of his ridiculous alarm this ſtorm of paſſion ſubſides, which ſtands unrivalled in its kind, in dramatic hiſtory. The ſoliloquy poſſeſſes a very uncommon beauty, that of forcible deſcription, united with paſſion and character.

racter. I ſhould ſcarcely heſitate to prefer the deſcription of Sir John Frugal's Counting-Houſe to Spenſer's Houſe of Riches.

It is very remarkable, that in this paſſage, the verſification is ſo exact (one line only excepted) and the diction ſo pure and elegant, that, although much more than a century has elapſed ſince it was written, it would be perhaps impoſſible to alter the meaſure or language without injury, and certainly very difficult to produce an equal length of blank verſe, from any modern poet, which ſhould bear a compariſon with Maſſinger's, even in the mechanical part of its conſtruction. This obſervation may be extended to all our poet's productions: majeſty, elegance, and ſweetneſs of diction predominate in them. It is needleſs to quote any ſingle paſſage for proof of this, becauſe none of thoſe which I am going to introduce, will afford any exception to the remark. Independent of character, the writings of this great poet abound with noble paſſages. It is only in the productions of true poetical genius that we meet with ſucceſsful alluſions to ſublime natural objects; the attempts of an inferior writer, in this kind, are either borrowed or diſguſting. If Maſſinger were to be tried by this rule alone, we muſt rank him very high; a few inſtances will prove this. Theophilus, ſpeaking of Diocleſian's arrival, ſays,

--- The

> ---- The marches of great Princes,
> Like to the motions of prodigious meteors,
> Are ſtep by ſtep obſerved. ----
> VIRGIN MARTYR, Act I. Sc. 1.

The introductory circumſtances of a threatning piece of intelligence, are

> ---------- but creeping billows
> Not got to ſhore yet. ------
> Ib. Act II. Sc. 2.

In the ſame play, we meet with this charming image, applied to a modeſt young nobleman;

> The ſun beams which the Emperor throws on him,
> Shine there but as in water, and gild him
> Not with one ſpot of pride.

No other figure could ſo happily illuſtrate the peace and purity of an ingenuous mind, uncorrupted by favour. Maſſinger ſeems fond of this thought; we meet with a ſimilar one in the Guardian;

> I have ſeen thoſe eyes with pleaſant glances play
> Upon Adorio's, like Phœbe's ſhine
> Gilding a cryſtal river. Act IV. Sc. 1.

There are two parallel paſſages in Shakeſpeare, to whom we are probably indebted for this, as well as for many other fine images of our poet. The firſt is in the Winter's Tale;

> He ſays he loves my daughter;
> I think ſo too; for never gaz'd the moon
> Upon the water, as he'll ſtand, and read,
> As 'twere, my daughter's eyes. Act IV. Sc. 4.

The

The ſecond is ludicrous;

KING. Vouchſafe, bright moon, on theſe thy ſtars to ſhine,
(Thoſe clouds removed) on our wat'ry eyne.
ROS. O vain petitioner, beg a greater matter,
Thou now requeſts't but moonſhine in the water.
LOVE'S LABOUR LOST, Act IV.

The following images are applied, I think, in a new manner;

As the ſun
Thou did'ſt riſe glorioufly, kept'ſt a conſtant courſe,
In all thy journey, and now, in the ev'ning,
When thou ſhould'ſt paſs with honour to thy reſt,
Wilt thou fall like a meteor?
VIRG. MART. Act V. Sc. 2.

O Summer friendſhip,
Whoſe flatt'ring leaves that ſhadow'd us in our
Proſperity, with the leaſt guſt drop off
In th' autumn of adverſity.
MAID OF HONOUR, Act III. Sc. 1.

In the laſt quoted play, Camiola ſays, in perplexity,

What a ſea
Of melting ice I walk on!

A very noble figure, in the following paſſage, ſeems borrowed from Shakeſpeare:

What a bridge
Of glaſs I walk upon, over a river
Of certain ruin! *mine own weighty fears*
Cracking what ſhould ſupport me.
BONDMAN, Act IV. Sc. 3.

I'll read you matter deep and dangerous,
As full of peril and advent'rous ſpirit

As to o'erwalk a current roaring loud,
On the unſteadfaſt footing of a ſpear.
HENRY IV. Part I. Act I. Sc. 3.

It cannot be denied that Maſſinger has improved on his original: He cannot be ſaid to borrow, ſo properly as to imitate. This remark may be applied to many other paſſages: thus, Harpax's menace,

- - - - - - - I'll take thee—and hang thee
In a contorted chain of icicles
I'th' frigid zone, - - - - - - - -
VIRG. MART. Act V. Sc. 1.

is derived from the ſame ſource with that paſſage in Meaſure for Meaſure, where it is ſaid to be a puniſhment in a future ſtate,

- - - - - - - - - - - - to reſide
In thrilling regions of thick-ribbed ice.

Again, in the Old Law, we meet with a paſſage, ſimilar to a much celebrated one of Shakeſpeare's, but copied with no common hand:

- - - - - - - - - - - - In my youth
I was a ſoldier, no coward in my age;
I never turn'd my back upon my foe:
I have felt nature's winter's ſickneſſes,
Yet ever kept a lively ſap within me,
To greet the cheerful ſpring of health again.
OLD LAW, Act I. Sc. 2.

Though I look old, yet I am ſtrong and luſty,
For in my youth I never did apply
Hot and rebellious liquors to my blood;
Nor did not with unbaſhful forehead woo
The means of weakneſs and debility,

Therefore

Therefore my age is as a luſty winter,
Froſty but kindly *. As YOU LIKE IT, Act II. Sc. 3.

Our poet's writings are ſtored with fine ſentiments, and the ſame obſervation which has been made on Shakeſpeare's, holds true of our author, that his ſentiments are ſo artfully introduced, that they appear to come uncalled, and to force themſelves on the mind of the ſpeaker†. In the legendary play of the Virgin Martyr, Angelo delivers a beautiful ſentiment, perfectly in the ſpirit of the piece;

- - - - - - - - - - Look on the poor
With gentle eyes, for in ſuch habits, often,
Angels deſire an alms.

When Franciſco, in the Duke of Milan, ſucceeds in his deſigns againſt the life of Marcelia, he remarks with exultation, that

When *he*'s a ſuitor, that brings cunning arm'd
With power to be his advocate, the denial
Is a diſeaſe as killing as the plague,
And chaſtity a clue that leads to death.

Piſander, in the Bondman, moralizes the in-

* In an expreſſion of Archidamas, in the Bondman, we diſcover, perhaps, the origin of an image in Paradiſe Loſt:

- - - - - O'er our heads, with *fail-ſtretch'd wings*,
Deſtruction hovers. - - - - Act I. Sc. 3.

Milton ſays of Satan,

- - - - - *His fail-broad vanns*
He ſpreads for flight.

† Mrs. Montagu's Eſſay on Shakeſpeare.

ſolence of the ſlaves to their late tyrants, after the revolt, in a manner that tends ſtrongly to intereſt us in his character:

Here they, that never ſee themſelves, but in
The glaſs of ſervile flatt'ry, might behold
The weak foundation upon which they build
That truſt in human frailty. Happy thoſe,
That, knowing in their births, they are ſubject to
Uncertain change, are ſtill prepar'd and arm'd
For either fortune: a rare principle!
And with much labour learn'd in wiſdom's ſchool.
For as theſe Bondmen by their actions ſhew
That their proſperity, like too large a ſail,
For their ſmall bark of judgment, ſinks them with
A fore-right gale of liberty, ere they reach
The point they long to touch at; ſo theſe wretches,
Swoln with the falſe opinion of their worth,
And proud of bleſſings left them, not acquired;
That did believe they could with giant-arms
Fathom the earth, and were above their fates;
Thoſe borrowed helps that did ſupport them vaniſh'd,
Fall of themſelves, and by unmanly ſuff'rings
Betray their proper weakneſs.

BONDMAN Act III. Sc. 3.

His complaint of the hardſhips of ſlavery muſt not be entirely paſſed over;

---------- The noble horſe,
That in his fiery youth from his wide noſtrils
Neigh'd courage to his rider, and broke through
Groves of oppoſed pikes, bearing his lord
Safe to triumphant victory, old or wounded,
Was ſet at liberty and freed from ſervice.
Th' Athenian mules that from the quarry drew
Marble, hew'd for the temples of the gods,

The

The great work ended, were diſmiſs'd, and fed
At th' public coſt; nay faithful dogs have found
Their ſepulchres; but man to man more cruel,
Appoints no end to th' ſuff'rings of his ſlave.
Ib. Act IV. Sc. 2

The ſenſe of degradation in a lofty mind, hurried into vice by a furious and irreſiſtible paſſion, is expreſſed very happily in the Renegado, by Donuſa.

- - - - - - - - - What poor means
Muſt I make uſe of now? And flatter ſuch,
To whom, till I betray'd my liberty,
One gracious look of mine would have erected
An altar to my ſervice.

Again,

- - - - - - O that I ſhould bluſh
To ſpeak what I ſo much deſire to do!

When Mathias, in the Picture, is informed by the magical ſkill of his friend, that his wife's honour is in danger, his firſt exclamations have at leaſt as much ſentiment as paſſion:

- - - - - - - - - - - - - - It is more
Impoſſible in Nature for groſs bodies
Deſcending, of themſelves to hang in th' air,
Or with my ſingle arm to underprop
A falling tower, nay in its violent courſe
To ſtop the lightning, than to ſtay a woman
Hurried by two furies, luſt and falſehood,
In her full career to wickedneſs - - - - - -
- -
- - - - - - - - - - - I am thrown
From a ſteep rock, headlong into a gulph

Of miſery, and find myſelf paſt hope,
In the ſame moment that I apprehend
That I am falling. - - - - - - - - - -

PICTURE, Act IV. Sc. 1.

But if Maſſinger does not always exhibit the livelieſt and moſt natural expreſſions of paſſion; if like moſt other poets, he ſometimes ſubſtitutes declamation for thoſe expreſſions; in deſcription at leaſt he puts forth all his ſtrength, and never diſappoints us of an aſtoniſhing exertion. We may be content to reſt his character, in the deſcription of paſſion, on the following ſingle inſtance. In the Very Woman, Almira's lover, Cardenes, is dangerouſly wounded in a quarrel, by Don John Antonio, who pays his addreſſes to her. Take now, a deſcription of Almira's frenzy on this event, which the prodigal author has put into the mouth of a chambermaid:

- - - - - - - - - If ſhe ſlumber'd, ſtrait,
As if ſome dreadful viſion had appear'd,
She ſtarted up, her hair unbound, and with
Diſtracted looks ſtaring about the chamber,
She aſks aloud, "Where is Martino? where
"Have you conceal'd him?" Sometimes names Antonio,
Trembling in ev'ry joint, her brows contracted;
Her fair face as 'twere chang'd into a curſe,
Her hands held up THUS, and as if her words
Were too big to find paſſge thro' her mouth,
She groans, then throws herſelf upon her bed,
Beating her breaſt. - - - - - - - - - -

A VERY WOMAN, Act II.

To

To praiſe or to elucidate this paſſage, would be equally ſuperfluous; I am acquainted with nothing ſuperior to it, in deſcriptive poetry, and it would be hardy to bring any ſingle inſtance in competition with it. Our poet is not leſs happy in his deſcriptions of inanimate nature, and his deſcriptions bear the peculiar ſtamp of true genius in their beautiful conciſeneſs. What an exquiſite picture does he preſent in the compaſs of leſs than two lines!

> - - - - - - - Yon' hanging cliff, that glaſſes
> His rugged forehead in the neighb'ring lake.
>
> RENEGADO.

Thus alſo Dorothea's deſcription of Paradiſe;

> *There*'s a perpetual Spring, perpetual youth,
> No joint-benumbing cold, nor ſcorching heat,
> Famine nor age have any being there.
>
> VIRG. MART. Act IV.

After all the encomiums on a rural life, and after all the ſoothing ſentiments and beautiful images laviſhed on it, by poets who never lived in the country, Maſſinger has furniſhed one of the moſt charming unborrowed deſcriptions that can be produced on the ſubject:

> Happy the golden mean! had I been born
> In a poor ſordid cottage, not nurs'd up
> With expectation to command a court,
> I might, like ſuch of your condition, ſweeteſt,
> Have tak'n a ſafe and middle courſe, and not,
> As I am now, againſt my choice compell'd,
> Or to lie grov'lling on the earth, or rais'd

So high upon the pinnacles of ſtate,
That I muſt either keep my height with danger,
Or fall with certain ruin. - - - - - - - -
- - - - - - - - - - - - - We might walk
In ſolitary groves, or in choice gardens;
From the variety of curious flowers
Contemplate nature's workmanſhip, and wonders;
And then, for change, near to the murmurs of
Some bubbling fountain, I might hear you ſing,
And from the well-tun'd accents of your tongue
In my imagination conceive
With what melodious harmony a quire
Of angels, ſing, above, their Maker's praiſes.
And then with chaſte diſcourſe, as we return'd,
Imp feathers to the broken wings of Time.
- -
- - - - - - - - - - - - - - Walk into
The ſilent groves, and hear the am'rous birds
Warbling their wanton notes; here a ſure ſhade
Of barren ſycamores, which th' all-ſeeing ſun
Could not pierce through; near that, an arbour hung
With ſpreading eglantine; there a bubbling ſpring
Wat'ring a bank of hyacinths and lilies.

GREAT DUKE OF FLORENCE.

Let us oppoſe to theſe peaceful and inglorious images, the picture of a triumph by the ſame maſterly hand;

- - - - - - - - - - When ſhe views you,
Like a triumphant conqueror, carried through
The ſtreets of Syracuſa, the glad people
Preſſing to meet you, and the ſenators
Contending who ſhall heap moſt honours on you;
The oxen crown'd with garlands led before you
Appointed for the ſacrifice; and the altars
Smoking with thankful incenſe to the gods.

The

The ſoldiers chanting loud hymns to your praiſe;
The windows fill'd with matrons, and with virgins
Throwing upon your head, as you paſs by,
The choiceſt flowers, and ſilently invoking
The Queen of Love, with their particular vows,
To be thought worthy of you. BONDMAN.

Every thing here is animated, yet every action is appropriated: a painter might work after this ſketch, without requiring an additional circumſtance.

The ſpeech of young Charolois, in the Funeral Proceſſion, if too metaphorical for his character and ſituation, is at leaſt highly poetical:

How like a ſilent ſtream ſhaded with night,
And gliding ſoftly with our windy ſighs,
Moves the whole frame of this ſolemnity!
- -
Whilſt I, the only murmur in this grove
Of death, thus hollowly break forth. - - - -
FATAL DOWRY.

It may afford ſome conſolation to inferior genius, to remark that even Maſſinger ſometimes employs pedantic and over-ſtrained alluſions. He was fond of diſplaying the little military knowledge he poſſeſſed, which he introduces, in the following paſſage, in a moſt extraordinary manner: one beautiful image in it, muſt excuſe the reſt:

- - - - - - - - - - Were Margaret only fair,
The cannon of her more than earthly form,
Though mounted high, commanding all beneath it,
And

And ramm'd with bullets of her ſparkling eyes,
Of all the bulwarks that defend your ſenſes
Could batter none but that which guards your fight.
But -
- - - - - - when you feel her touch and breath
Like a ſoft weſtern wind, when it glides o'er
Arabia, creating gums and ſpices,
And in the van, the nectar of her lips
Which you muſt taſte, brings the battalia on,
Well arm'd, and ſtrongly lin'd with her diſcourſe,
- -
Hyppolitus himſelf would leave Diana,
To follow ſuch a Venus.

NEW WAY TO PAY OLD DEBTS. Act.

What pity, that he ſhould ever write ſo extravagantly, who could produce this tender and delicate image, in another piece:

What's that? Oh! nothing but the whiſp'ring wind,
Breathes thro' yon churliſh hawthorn, that grew rude,
As if it chid the gentle breath that kiſs'd it.

OLD LAW. Act.

I wiſh it could be added to Maſſinger's juſt praiſes, that he had preſerved his ſcenes from the impure dialogue which diſguſts us in moſt of our old writers. But we may obſerve, in defence of his failure, that ſeveral cauſes operated at that time to produce ſuch a dialogue, and that an author who ſubſiſted by writing was abſolutely ſubjected to the influence of thoſe cauſes. The manners of the age permitted great freedoms in language; the theatre was not frequented by the beſt company; the male part of the audience was by

by much the more numerous; and, what perhaps had a greater effect than any of theſe, the women's parts were performed by boys. So powerful was the effect of thoſe circumſtances, that Cartwright is the only dramatiſt of that age whoſe works are tolerably free from indecency. Maſſinger's error, perhaps, appears more ſtrongly, becauſe his indelicacy has not always the apology of wit; for, either from a natural deficiency in that quality, or from the peculiar model on which he had formed himſelf, his comic characters are leſs witty than thoſe of his cotemporaries, and when he attemps wit, he frequently degenerates into buffoonery. But he has ſhewed in a remarkable manner the juſtneſs of his taſte, in declining the practice of quibbling; and as wit and a quibble were ſuppoſed, in that age, to be inſeparable, we are perhaps to ſeek, in his averſion to the prevailing folly, the true cauſe of his ſparing employment of wit.

Our poet excells more in the deſcription than in the expreſſion of paſſion; this may be aſcribed in ſome meaſure to his nice attention to the fable: while his ſcenes are managed with conſummate ſkill, the lighter ſhades of character and ſentiment are loſt in the tendency of each part to the cataſtrophe.

The prevailing beauties of his productions are dignity and elegance; their predominant fault is want of paſſion.

The

The melody, force, and variety of his verſification are every where remarkable: admitting the force of all the objections which are made to the employment of blank verſe in comedy, Maſſinger's poſſeſſes charms ſufficient to diſſipate them all. It is indeed equally different from that which modern authors are pleaſed to ſtile blank verſe, and from the flippant proſe ſo loudly celebrated in the comedies of the day. The neglect of our old comedies ſeems to ariſe from other cauſes, than from the employment of blank verſe in their dialogue; for, in general, its conſtruction is ſo natural, that in the mouth of a good actor it runs into elegant proſe. The frequent delineations of periſhable manners in our old comedy, have occaſioned this neglect, and we may foreſee the fate of our preſent faſhionable pieces, in that which has attended Johnſon's, Fletcher's, and Maſſinger's: they are either entirely overlooked, or ſo mutilated, to fit them for repreſentation, as neither to retain the dignity of the old comedy, nor to acquire the graces of the new.

The changes of manners have neceſſarily produced very remarkable effects, on theatrical performances. In proportion as our beſt writers are farther removed from the preſent times, they exhibit bolder and more diverſified characters, becauſe the prevailing manners admitted a fuller diſplay of ſentiments, in the common intercourſe

of

of life. Our own times, in which the intention of polite education is to produce a general, uniform manner, afford little diverſity of character for the ſtage. Our dramatiſts, therefore, mark the diſtinctions of their characters, by incidents more than by ſentiments, and abound more in ſtriking ſituations than intereſting dialogue. In the old comedy, the cataſtrophe is occaſioned, in general, by a change in the mind of ſome principal character, artfully prepared, and cautiouſly conducted; in the modern, the unfolding of the plot is effected by the overturning of a ſcreen, the opening of a door, or by ſome other equally dignified machine.

When we compare Maſſinger with the other dramatic writers of his age, we cannot long heſitate where to place him. More natural in his characters, and more poetical in his diction, than Johnſon or Cartwright, more elevated and nervous than Fletcher, the only writers who can be ſuppoſed to conteſt his pre-eminence, Maſſinger ranks immediately under Shakeſpeare himſelf*.

It muſt be confeſſed, that in comedy Maſſinger falls conſiderably beneath Shakeſpeare; his wit is leſs brilliant, and his ridicule leſs delicate

* I omit Milton, becauſe his Samſon is an exotic, not captivating to the eyes of Engliſhmen; and whatever detached beauties Comus may poſſeſs, it is incomparably heavy, conſidered as a dramatic piece.

and

and various; but he affords a ſpecimen of elegant comedy*, of which there is no archetype in his great predeceſſor. By the rules of a very judicious critic†, the characters in this piece appear to be of too elevated a rank for comedy; yet though the plot is ſomewhat embarraſſed by this circumſtance, the diverſity, ſpirit, and conſiſtency of the characters render it a moſt intereſting play. In tragedy, Maſſinger is rather eloquent than pathetic; yet he is often as majeſtic, and generally more elegant than his maſter; he is as powerful a ruler of the underſtanding, as Shakeſpeare is of the paſſions: with the diſadvantage of ſucceeding that matchleſs poet, there is ſtill much original beauty in his works; and the moſt extenſive acquaintance with poetry will hardly diminiſh the pleaſure of a reader and admirer of Maſſinger.

* The Great Duke of Florence.

† See the Eſſay on the Provinces of the Drama.

Observations *on the* Bills *of* Mortality *for the Towns of* Manchester *and* Salford; *by* Thomas Henry, F. R. S. *Acad. Philoſ. Amer.; Philadel.; Med. Lond. & Phyſic. Edinb. Soc.*

read January 18, 1786.

In the year 1773, ſeveral perſons, many of whom are now Members of this Society, ſubſcribed, for the purpoſe of obtaining an accurate account of the ſtate of the population of the towns of Mancheſter and Salford*, which ſhould contain the number of houſes, families, males, females, &c. The reſult of this inquiry, which was inſtituted with a view to the opinion, at that time propagated, of the general decline of population in the kingdom, proved that, inſtead of being diminiſhed, as was ſuppoſed to be the caſe with the inhabitants of London, the number of perſons, reſiding in Mancheſter and Salford, was greatly increaſed: that the

* Mancheſter and Salford, though diſtinct townſhips, are only ſeparated by the river Irwel, and communicate by means of ſeveral bridges. In the year 1757 the number of inhabitants was no more than 19839.

number

number of tenanted houſes was 4268; of families 6416, and of inhabitants 27246; or $6\frac{1}{4}$ to a houſe. But, in this account, the number of inhabitants reſiding in the townſhips, almoſt the whole of which was then nearly contiguous with the towns, and now forms a part of them, was not included. Theſe diſtricts contained, at that time, 311 houſes, 361 families, and 1905 individuals. This number, added to the former, makes that of the inhabitants amount to 29151*.

Soon after the period, at which this ſurvey was taken, a very conſiderable increaſe of inhabitants took place. The ſpirit and ingenuity of our manufactures made extraordinary and rapid improvements in our fabrics; and the introduction of machinery, inſtead of leſſening the number of hands, found employment for many additional people. The town extended on every ſide, and ſuch was the influx of inhabitants, that though a great number of new houſes were built, they were occupied even before they were finiſhed.

The progreſs of the trade and population, though certainly checked, was not wholly reſtrained, by the unfortunate, and ever to be lamented, war, which was waged, during a period of almoſt nine years, with our American Colonies, ſupported by the immenſe and united

* Dr. Percival's Eſſays, vol. III.

forces

forces of France, Spain and Holland. Contrary to every reasonable expectation the manufactures of Manchester were not affected by the war, to any great and alarming degree; and they still found their way, by various channels, to almost every market, where they had been usually sold. By casting our eyes on the bills of mortality, for those years, we find the population of the towns greatly advancing, and, what is a pleasing circumstance, especially considering the number of men, of which they were drained, for the supply of his Majesty's fleets and armies, we see a striking superiority of the births over the burials.

On the happy event of the restoration of peace, the influx of inhabitants was surprizingly great. Multitudes of men, who had served abroad, or in our provincial regiments at home, now returned into the country; and the success of the opposition which was made to the monopoly of the cotton machines, drew, from various quarters, large recruits of people. During the three last years the number of our christenings has been much augmented, but though they still maintain a majority, yet I am sorry to observe, that the list of burials, when compared with those of the three preceding years, is more than proportionably enlarged. A contagious fever has proved very destructive, and its virulence has been, probably, increased, by the crowded and

uncleanly manner, in which the poorer people have been lodged, owing to the want of houſes to accommodate them: for, though many have been erected, yet ſeveral cauſes have contributed to reſtrain the ſpirit of building. During the war, the high price of timber was a conſiderable obſtacle; and, ſince the peace, the froſts, which were, for two years together, very intenſe, and continued till the ſpring was far advanced, have prevented the making of bricks, and, together with the tax, greatly enhanced their price. From theſe cauſes, I believe, were an actual ſurvey taken at preſent, the number of inhabitants, to a houſe, would far exceed the amount in the year 1773*. But it is proper to obſerve that the devaſtations of this diſeaſe have not been confined to this place. Dr. Fothergill of Bath informs me that all the manufacturing towns, in the vicinity of that city, have been afflicted by a fever of a ſimilar kind. Under ſo heavy a viſitation, it is a pleaſing conſideration, that, in all probability, the havock, it might have made, has been leſſened by the well-timed and charitable aſſiſtance that has been afforded, by the truſtees of our infirmary, to many unhappy objects, labouring under this dire diſeaſe, at their own homes;

* I have too frequently had opportunities of ſeeing a man with his wife and three or four children, all reſiding in one ſmall room, in which they dreſs their victuals, eat, work, and ſleep.

and

and by the humane and skilful treatment of the worthy physicians who have attended them*.

That the progressive increase of the number of inhabitants of Manchester and Salford may be the better apparent, I have divided a period of twenty-one years into seven smaller periods of three years each, and have given the annual number of registered christenings, marriages and burials, during each of these. And, from these premises, I shall afterwards endeavour to form some calculation of the present number of our inhabitants, compared with that of the year 1773.

TABLE I.

Shewing the AVERAGE, ANNUAL NUMBER of REGISTERED CHRISTENINGS, MARRIAGES, and BURIALS, for Periods of three Years each, from 1765 to 1785, inclusive—Fractions omitted.

CHRISTENINGS.

1765, 1766, 1767	-	-	900
1768, 1769, 1770	-	-	1002

* About this time a very useful extension of the charity, afforded by this excellent institution, was agreed to by the trustees. All diseases of an infectious nature being wisely excluded from admission into the infirmary, many unhappy objects were necessarily excluded from the benefit of the assistance, afforded in other cases. The physicians, therefore, humanely offered to visit them at their own houses, provided the trustees would allow them to be furnished with medicines from the hospital. The benevolent proposal was accepted, to the great comfort of the poor.

1771, 1772, 1773 - -	1098
1774, 1775, 1776 - -	1237
1777, 1778, 1779 - -	1475
1780, 1781, 1782 - -	1611
1783, 1784, 1785 - -	1838

MARRIAGES.

1765, 1766, 1767 - -	367
1768, 1769, 1770 - -	415
1771, 1772, 1773 - -	411
1774, 1775, 1776 - -	463
1777, 1778, 1779 - -	503
1780, 1781, 1782 - -	508
1783, 1784, 1785 - -	807

BURIALS.

1765, 1766, 1767 - -	811
1768, 1769, 1770 - -	881
1771, 1772, 1773 - -	835
1774, 1775, 1776 - -	1004
1777, 1778, 1779 - -	1042
1780, 1781, 1782 - -	1115
1783, 1784, 1785 - -	1468

TABLE

TABLE II.

Containing a CALCULATION of the Number of the preſent INHABITANTS of MANCHESTER and SALFORD, from a Compariſon of the BILLS of MORTALITY for the three laſt Years, with thoſe of the Years preceding the actual Enumeration in 1773.

IN 1773 the total number of the inhabitants of Manchester and Salford, including the Townſhips, was -	29151
The average number of burials, diſſenters included, for five preceding years, was	958
The proportion of deaths to the inhabitans was therefore as one to - -	30.5
The average number of chriſtenings, for the above years, was - - -	1098
And the proportion of theſe to the inhabitants as one to - - - -	26.4
But Dr. Percival, not having included the inhabitants of the townſhip, makes the deaths as one to - - - -	28.4
And the chriſtenings as one to - -	25
The average number of burials, diſſenters included, for the years 1783-4-and-5 is	1518⅓

Which multiplied by 28.4 makes the number of inhabitants - - 43120

And by 30.5 - - - - 46309

The average number of chriſtenings during the above three years, allowing 150 for diſſenters, of all denominations is 1988$\frac{1}{3}$

Which multiplied by 25 makes - 49708

But by 26.5 - - - - 52334

Average between 43120$\frac{2}{3}$, the number obtained by multiplying the burials by 28.4 and 49708$\frac{1}{3}$, number obtained by multiplying the chriſtenings by 25, is 46414

And between 46309$\frac{1}{4}$, number obtained by multiplying the burials by 30.5, and 52334, by multiplying the chriſtenings by 26.5 - - - 49326

The greateſt number of burials in any one year, from 1766 to 1773, incluſive, was 1019

Ditto from 1778 to 1785 incluſive - 1734

The latter exceeding the former by 0.7 — 20405 or 0.7 of 29151, the number of inhabitants in 1773, added to that number, gives - - - 49556

The greateſt number of chriſtenings during any one year of the former period, was - - - - - 1168

During the latter period - - 1958

The latter, exceeding the former number, by 0.67, therefore 19530 or 0.67 of

the

the inhabitants in 1773, added to 29151, gives - - - - 48681

From all these different views, we may, I think, be authorized to conclude that the number of inhabitants of the two towns, cannot be much lower than fifty thousand; especially as from a circumstance, of which I shall hereafter take notice, it is probable that the annual number of deaths is under-rated.

Dr. Percival, whose attention was, some years since, particularly directed to the subject of this paper, pointed out a plan of keeping the Parish Register, which, if it had been pursued, would have been productive of great advantages; and he took pains to ascertain the proportion of deaths by the small-pox, to those by all other diseases*. In the course of this inquiry he found that, in a space of six years, from 1769, to 1774, inclusive, the deaths, by the small-pox, were nearly one sixth and a half of the whole†. I am happy to observe that, in the last six years, the fatality of this terrible disease has abated; for the deaths by the small-pox,

* Dr. Percival's Essays, vol. III.

† During the years 1772-3-and-4 the deaths by the small-pox, in Leverpool, amounted, according to an account, communicated by the late Dr. Dobson to Dr. Haygarth, to one in $5\frac{1}{2}$ of the whole.

from 1780 to 1785, inclusive, only amount to one seventh and a half of the whole number of burials, registered at the collegiate church.

Perhaps there is no disease the medical treatment of which has been more improved than that of the small-pox; and, the improvements, suiting the dispositions and convenience of the lower class of people, have been more frequently adopted than might otherwise have been expected. But prejudices are not to be overcome at once. Time and experience will, I am convinced, carry conviction to the breasts of most men; and the practice of the cool regimen, under proper limitations, the more general practice of inoculation, and the observance of such regulations, as have been publicly recommended by our truly humane and learned associate, Dr. Haygarth, will, in all probability, tend effectually to the farther diminution, if not to the total extinction of the ravages of this loathsome, and, too frequently fatal malady.

Within these few years also the great alterations that have been made in the town, by widening, and providing for the ventilation of the streets, together with the commodiousness of our modern houses, &c. may have contributed to restrain the increased mortality which might otherwise have been apprehended from its enlargement*: for great towns, it must be allowed, are unfavourable to the duration of human life.

* Vide Percival's Essays, vol. III.

To

To find numerous instances of longevity we must leave the widely extended commercial city, where attention to the gain of riches occupies the earlier attention of the superior class of inhabitants, and too frequently, indolence and luxury that of their latter days. Where plenty of employment, though it furnish abundance of the comforts and conveniences of life, to the labouring part of the people, and thereby is preventive of many diseases, yet supplies also the means of intemperance, which though slowly, yet certainly, induces sickness. Accordingly we find that, as our town has increased, the proportion of deaths, at ages above seventy has decreased. During two periods of five years each the number of deaths of persons, above that age, will appear from the following table.

TABLE III.

Containing the different Number of DEATHS, of PERSONS above the Age of Seventy, in two PERIODS of five Years each.

From 1776 to 1780, inclusive.		From 1781 to 1785, inclusive.	
From 70 to 80	212	From 70 to 80	226
80 to 90	101	80 to 90	114
90 to 100	16	90 to 100	19
	329		359

The

The number in the former period is as 1.7 to 9.3; whereas that in the latter is only as 1.5 to 11.5, of the whole number of regiſtered funerals.

But injurious as large towns may be to the duration of life, and though it muſt be granted that by annually draining the country of a number of inhabitants, they conſume many lives, which, in their original ſituation, might have continued to exiſt for ſeveral years longer, but are cut off by diſeaſes produced by vitiated air, by infection, or by a change in their modes of living, yet on the whole, they are not, perhaps, ſo unfavourable to population as they may, at firſt ſight, appear. For in large towns, at leaſt in thoſe where extenſive manufactures are carried on, the encouragements to matrimony are conſiderable; and, therefore, if life be more ſpeedily waſted, it is, probably, produced in a far greater ratio*. A ſenſible, induſtrious manufacturer conſiders his children as his treaſure, and boaſts that his quiver is full of them; for where children can be employed at an early age, the fear of a large family is not only diminiſhed, but

* That this is actually the caſe in Mancheſter and Salford appears from the regiſters, although during a period of twenty-one years the marriages and births have been *more* than doubled, yet the increaſe of burials is only as 29 to 16.

every

every child that is born may be regarded as an addition of fortune.

A large and populous town, also, is favourable to population, by extending its influence, to a very considerable distance, beyond its own districts. Manchester supplies employment to many thousand people, resident within the country, to the extent of several miles, who gain a comfortable livelihood, in different branches of the manufactory, without suffering the inconveniences which attend the town. The demand of this great body of people, who raise but a very small part of the provisions they consume, added to that of the town, has an effect upon a still larger tract of country, the inhabitants of which are occupied in agriculture; and, being sure of finding a ready and advantageous mart for their products, they are encouraged to a better tillage of their lands, already in cultivation, and to the improvement of waste lands; and that cultivation and competency will increase population by removing the obstacles to matrimony, is an axiom, the truth of which cannot be disputed.

That the increase of the adjacent country keeps pace with that of the town, appears from the state of population in the neighbouring parish of Eccles, where the bills of mortality are kept with an exemplary degree of accuracy. The clerk, at the same time that he distributes, through

through the parish, the bill for the preceding year, makes an actual enumeration of the families, houses, and individuals. In the year 1776 the number of inhabitants was 7936, and, in the year 1785, 10522, so that in nine years there has been an addition of 2586 people. And, if we may trust the observation of our senses the increase has been, at least, equal, in most of the parishes to which the manufactory extends.

I find an article in the bill of mortality, for the parish of Eccles, in the year 1784, ascertaining the number of ex-parishioners, buried there, in that year, which amounts to ninety-five. From the situation of the church, as distant from every other parish but that of Manchester, I am convinced that, by far the greatest proportion of them come from hence. And as I have also no doubt, but there are greater numbers carried out to the different chapels of ease and neighbouring parishes than are brought in from other townships and parishes, I believe I may ventureto assert that, the number of deaths, in Manchester and Salford, are greater than they appear to be from our own parish register. The burial grounds within the towns, are either so crowded, or so expensive, as to deter many persons from depositing their deceased relations in them. Yet, even making every allowance of this kind, the great superiority of the births over the burials cannot be disputed. During the last

six

six years, though the latter have been unusually numerous, the registered births have exceeded the registered burials, by an average of 433, annually*.

* Since this paper was read, the bills of mortality, for the years 1786 and 1787, have been published. In the former year, the registered births amounted to 2219, and the burials to 1282; superiority of births 937. In the latter, the births were 2256, and the burials 1761—superiority, 495. And as none of the dissenters are baptized, though many are buried, at the churches, the proportions of births to burials is still greater than is stated. Taking the year 1785 into the account so as to form a period of three years; the average annual number of births, during that period, will be 2139, and that of the deaths, 1592. The former multiplied by 26.5 produces 56683, and the latter, by 30.5 produces 48556; the average of these numbers will be 52619, and if we allow fifty unregistered funerals and 150 births for the dissenters, and multiply and average these as above, we shall have 2745, which added to 52619, will produce 55364, and may be received as nearly the number of inhabitants in Manchester and Salford at the beginning of the present year.

August 25, 1788.

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CONJECTURES *relative to the* CAUSE *of the* INCREASE *of* WEIGHT *acquired by ſome* HEATED BODIES, *during cooling*; *by* THOMAS HENRY, *junior*. *Communicated by* THOMAS HENRY, F. R. S. *&c.*

READ MARCH 28, 1786.

MANY experiments have been made by different perſons, with a view to determine, whether the addition of actual heat to bodies does increaſe their weight. M. Buffon has aſſerted, that a ball of iron, weighing, when cold, 49lb. 11oz. increaſed in weight, when made of a white heat, in the proportion of $19\frac{1}{5}$ grains to every pound. But, it is very probable, that, in this experiment, there was ſome fallacy, ſince we find it directly contradictory to the reſults both of the experiments made by Dr. Roebuck*, and of thoſe made by Mr. Whitehurſt†. The firſt of theſe two Gentlemen found, that a cylinder of wrought iron, heated to a welding heat, at which time it weighed, in a very accurate balance, fifty-five pounds,

* Phil. Tranſ. vol. LXVI. † Ib.

gradually

gradually acquired, as it cooled, an increaſe of weight, ſo that, at the end of twenty-two hours, it weighed ſix penny weights, ſeventeen grains more, than it did when firſt committed to the balance. This phænomenon, which, by ſome has been adduced to prove, that heat is the principle of levity in bodies, Mr. Whitehurſt has endeavoured to explain, by ſuppoſing, that the air, above the ſcale being rarefied by the heated iron, the cold air below ruſhed up, and, ſtriking againſt the bottom of the ſcale, not only prevented its deſcent, but even buoyed it up. Something may perhaps be attributed to this cauſe. But would not the circumambient air beneath the ſcale be nearly as much rarefied as that above? And is it not probable, that the ſuppoſed force of this current of air, would be, in great meaſure, counteracted by the greater tendency a body has to deſcend in a rarefied, than in a denſe medium? Is it not probable, likewiſe, that the end of the beam, to which the heated iron was appended, would by the ſame heat which rarefied the air, be more expanded, and lengthened, owing to its nearer approximation to the ſource from which the heat flowed, than the more diſtant end of the beam? I would likewiſe obſerve, that in the experiment of M. Buffon above quoted, and in one made by Dr. Roebuck on a ſmaller ſcale, the maſs, owing perhaps to the

joint

joint action of the above causes, weighed more when hot, than when cold.

Having thus endeavoured to shew, the insufficiency of the explanation given by Mr. Whitehurst, I will venture, with the greatest diffidence, to propose the following query. May not the increase of weight, acquired by heated iron, and copper, during cooling, be ascribed to the calcination, and consequent absorption of air, continuing to proceed after the removal of the mass of metal from the fire, the absorption of air in particular, in the first stages of the cooling, perhaps, with increased rapidity? In support of this conjecture, the following facts may be adduced. First; That some metals, particularly copper*, are found to calcine more rapidly, in a moderate degree of heat, than in one more intense. Secondly; That, the calces of some metals, as that of lead, have been observed to increase in weight by long exposure to the air, and that they now afford by proper treatment, more air, than could have been obtained from them, previous to such exposure. Thirdly; We shall find by examining Dr. Roebuck's account of his experiments, that the weight continued to increase long after the cause assigned by Mr. Whitehurst must have ceased to act. The cylinder, which was repeatedly

* Macquer's Inst. of Chemistry, vol. I.

weighed

weighed at intervals, when it had been in the ſcale ſix hours, and had then loſt ſo much of its heat, as to be only blood warm, was found to be acquiring weight in the proportion of ſeven grains in the ſpace of an hour*. But, when weighed the day following, at the expiration of twenty-four hours after the commencement of the experiment, it had acquired a ſtill further addition of two pennyweights and ſeventeen grains, which, according to the above progreſſion, it would have required at leaſt nine hours and a half, nay, moſt probably, even a longer time, to accompliſh. If to theſe nine hours and a half, we add the preceding ſix, we obtain fifteen hours and a half; a period long before the expiration of which, the maſs of iron muſt have taken the temperature of the ſurrounding bodies, ſince the firſt ſix of theſe were ſufficient to reduce it, from the welding point, down to blood heat.

I will not treſpaſs longer on the time of the Society, but will conclude by obſerving, that metals, which are the only bodies hitherto employed to determine this point, are certainly, from the changes they undergo by the action

* During the two firſt hours of its expoſure in the ſcale, the increaſe of weight had proceeded with much more rapidity; in the third hour it proceeded leſs quickly, and continued to diminiſh gradually in celerity to the expiration of the ſixth.

of heat, very ill adapted to the purpoſe; and that to arrive at any degree of certainty, it will perhaps be neceſſary to weigh the body in vacuo, or at leaſt in a veſſel ſo confined, as that any current of air through it ſhall be prevented; and that the beam of the ſcales ſhall be formed of materials leſs liable to expanſion by heat, than metals in general are.

REMARKS *on the* FLOATING *of* CORK BALLS *in* WATER; *by Mr.* BANKS, *Lecturer in Natural Philoſophy. Communicated by the Rev.* THOMAS BARNES, D. D. *Fellow of the American Philoſophical Society, holden at Philadelphia.*

READ DECEMBER 6, 1786.

PERHAPS no ſimple appearance ſeems ſo generally miſunderſtood as that of Cork Balls, &c. on Water; and as one falſe principle, adopted, is often productive of more, a few obſervations on ſo ſimple a phenomenon, perhaps, may not be thought below the notice of the learned, although perfectly acquainted with the true cauſe. That clean bubbles of glaſs or pieces of cork, left to ſwim in water, contained in clean veſſels of glaſs or china, and at the diſtance

diſtance of about one inch from the ſide, will approach that ſide is certain; and it appears that this and ſimilar experiments have frequently been made by philoſophers, to prove the attraction of theſe bodies. To this I cannot aſſent, for different reaſons; which I preſume are ſupported by the following experiments.

The experiments are made in a veſſel of glaſs or earthen ware five or ſix inches in diameter.

Experiment I. If a clean cork be wet and placed about one inch from the ſide of the containing veſſel, it will approach the ſide with an accelerated motion.

Experiment II. If two corks be placed about an inch from each other, and at a ſufficient diſtance from the ſide, they approach each other in the ſame manner.

Experiment III. Pour water into the veſſel till it is rather higher than the brim; place the cork cloſe by the ſide, and it recedes with a retarded motion.

Experiment IV. Sink a piece of metal in the center of the veſſel, ſo that the top thereof may be above the ſurface of the water, the cork, placed at a proper diſtance, will approach it.

Experiment V. Raiſe the water until the metal is covered, and the cork will remain at reſt at any diſtance from the metal.

In all the experiments, the water which ſurrounds the balls is elevated by capillary attraction, as alſo by the ſide of the containing veſſel, except in experiment III.

Experiment VI. Pieces of dry cork, or painted balls, placed gently on water, and near each other, alſo approach each other; but if one is placed near the ſide of the containing veſſel, adjoining to which the water is elevated, it will recede.

In this experiment the ſurrounding fluid is depreſſed.

Whether theſe bodies attract each other, or not, I preſume is not to be determined by theſe experiments; however they are not intended to diſprove any attraction, but rather to prove that there is ſome other more powerful cauſe on which the phenomena depend: if not, why does the ball in the third experiment leave the ſide, to which it adhered in the firſt; or how ſhall we account for the univerſal receſs of balls around which the fluid is depreſſed, from thoſe around which it is elevated; and why are they not attracted by bodies exceedingly near, when theſe bodies are perfectly covered with water?

Theſe experiments I know are not of ſufficient weight with ſome who rank high amongſt the literati, to prove that the phenomena are not owing to attraction; yet I preſume the true cauſe has long ſince been explained upon hydroſtatical

ſtatical principles by Dr. W. J. Graveſande, &c. for, as every body which ſwims impreſſes the ſupporting fluid with a force equal to its own weight, the fluid reacts and preſſes the ſupported body with the ſame force. The ſides of the body are alſo preſſed by the ſurrounding fluid with forces which are as the depth: and if the encompaſſing water be raiſed by capillary attraction, the preſſure will ſtill be the ſame, or equal on oppoſite ſides, ſo that without force the body cannot move; but if it be placed ſo near the ſide that the water elevated by it joins that elevated by the ſide of the veſſel, or by another ball, the preſſure on that ſide is diminiſhed, while that on the other ſide, remaining the ſame, will cauſe it to approach the ſide or other ball: and in the ſame manner, if the fluid is depreſſed, when the cavities meet, the preſſure on that ſide will be diminiſhed, and the bodies of conſequence approach each other or the ſide of the veſſel; and the receſs in the third experiment is evidently owing to the preſſure being ſuperior on that ſide neareſt to the glaſs, when the fluid is elevated above it, and the elevation round the ball joins the declining ſurface near the edge. Some indeed have drawn directly the contrary concluſion; but when the elevated water which ſurrounds the ball, and is ſupported by it, is cauſed with one ſide to join the declining ſurface of the ſupporting fluid, it muſt then gra-

vitate and press in all directions with more force as there is more of it elevated above the surface of the supporting water.

Case *of a* Person *becoming* short-sighted *in* advanced Age; *by* Thomas Henry, F.R.S. *&c.*

read november 29, 1786.

I remember it was, some years since, mentioned in this Society, that a method had been recommended, but where or by whom I do not recollect, of preventing the necessity of using spectacles, in advanced age. It consisted in the practice of reading a very small print by the light of a small candle. By this means, the humours of the eye being protruded, the crystalline lens was supposed to be hindered from losing its convex form, and assuming that flatness, which it acquires in old persons.

I lately met with a Gentleman, who, contrary to what generally happens to men as they advance in life, was, at the age of fifty, become short-sighted; whereas, when younger, his eyes had not that fault; and who instead of being obliged to use convex glasses, had found it necessary

necessary to employ concave ones, and to procure them still more so, the older he grew. This change in his sight, he informed me, he first observed, after having for some time, accustomed himself to read a book, printed in a small character, and, *that*, frequently in the close of the evening, when the light was not favourable for the purpose.

As this is an uncommon fact, and may serve to confirm the propriety of the doctrine, I have alluded to, I thought it might be proper to communicate it to the Society.

An Account of the PROGRESS *of* POPULATION, AGRICULTURE, MANNERS, *and* GOVERNMENT *in* PENSYLVANIA. *In a Letter from* BENJAMIN RUSH, M. D. *and Professor of Chemistry in the University of* PENSYLVANIA, *to* THOMAS PERCIVAL, M. D. F. R. S. *&c. &c.*

READ DECEMBER 6, 1786.

SIR,

WHATEVER tends to unfold facts in the history of the human species must be interesting to a curious inquirer. The manner of settling a new country exhibits a view of the human mind so foreign to the views of it which

have been taken for many centuries in Europe, that I flatter myſelf the following account of the progreſs of Population, Agriculture, Manners, and Government in Penſylvania will be acceptable to you. I have choſen to confine myſelf, in the preſent letter, to Penſylvania only, that all the information I ſhall give you may be derived from my own knowledge and obſervations.

The *firſt* ſettler in the woods, is generally a man who has outlived his credit or fortune in the cultivated parts of the ſtate. His time for migrating is in the month of April. His firſt object is to build a ſmall cabin of rough logs, for himſelf and family. The floor of this cabin is of earth, the roof of ſplit logs, the light is received through the door, and in ſome inſtances, through a ſmall window made of greaſed paper. A coarſer building, adjoining this cabin, affords a ſhelter to a cow and a pair of poor horſes. The labour of erecting theſe buildings is ſucceeded by killing the trees on a few acres of ground near his cabin. This is done by cutting a circle round the trees, two or three feet from the ground. The ground around theſe trees is then ploughed, and Indian corn planted in it. The ſeaſon for planting this grain is about the twentieth of May. It grows generally, on new ground, with but little cultivation, and yields in the month of October following, from forty to fifty buſhels an acre. After the firſt of September, it affords a good

good deal of nouriſhment to his family in its green or unripe ſtate, in the form of what is called *roaſting ears*. His family is fed, during the ſummer, by a ſmall quantity of grain, which he carries with him, and by fiſh and game. His cows and horſes feed upon wild graſs, or the ſucculent twigs of the woods. For the firſt year, he endures a great deal of diſtreſs from hunger, cold, and a variety of accidental cauſes; but he ſeldom complains or ſinks under them. As he lives in the neighbourhood of Indians, he ſoon acquires a ſtrong tincture of their manners. His exertions, while they continue, are violent, but they are ſucceeded by long intervals of reſt. His pleaſures conſiſt chiefly in fiſhing and hunting. He loves ſpirituous liquors, and he eats, drinks, and ſleeps in dirt and rags, in his little cabin.

In his intercourſe with the world, he manifeſts all the arts which characterize the Indians of our country. In this ſituation he paſſes two or three years. In proportion as population increaſes around him, he becomes uneaſy and diſſatisfied. Formerly, his cattle ranged at large, but now his neighbours call upon him to confine them within fences, to prevent their treſpaſſing upon their fields of grain. Formerly, he fed his family upon wild animals, but theſe, which fly from the face of man, now ceaſe to afford him an eaſy ſubſiſtence, and he is compelled to raiſe domeſtic animals for the ſupport of his family. He cannot

not bear to ſurrender up a ſingle natural right for all the benefits of government, and therefore he abandons his little ſettlement, and ſeeks a retreat in the woods, where he again ſubmits to all the toils which have been mentioned. There are inſtances of many men who have broken ground, on bare creation, not leſs than four different times in this way, in different and more advanced parts of the ſtate. It has been remarked, that the flight of this claſs of people is always increaſed by the preaching of the goſpel. This will not ſurprize us when we conſider how oppoſite its precepts are to their licentious manner of living. If our firſt ſettler were the owner of the ſpot of land which he began to cultivate, he ſells it at a conſiderable profit to his ſucceſſor; but if (as is oftener the caſe) he were a tenant to ſome rich land-holder, he abandons it in debt; but the ſmall improvements he leaves behind him generally make it an object of immediate demand to a *ſecond* ſpecies of ſettler.

This ſpecies of ſettler is generally a man of ſome property. He pays one third, or one fourth part in caſh for his plantation, which conſiſts of three or four hundred acres, and the reſt in gales or inſtalments, as it is called here; that is, a certain ſum yearly, without intereſt, till the whole is paid. The firſt object of this ſettler is to build an addition to his cabin. This is done with hewn logs, and, as ſaw mills generally follow

low ſettlements, his floors are made of boards; his roof is made of what are called clab-boards, which are a kind of coarſe ſhingles ſplit out of ſhort logs. This houſe is divided by two floors, on each of which are two rooms. Under the whole is a cellar walled with ſtone. The cabin ſerves as a kitchen to this houſe. His next object is to clear a little meadow ground, and plant an orchard of two or three hundred apple trees. His ſtable is likewiſe enlarged, and, in the courſe of a year or two, he builds a large log-barn, the roof of which is commonly thatched with rye ſtraw. He, moreover, increaſes the quantity of his arable land, and inſtead of cultivating Indian corn alone, he raiſes a quantity of wheat and rye. The latter is cultivated chiefly for the purpoſe of being diſtilled into whiſky. This ſpecies of ſettler by no means extracts all from the earth which it is able and willing to give. His fields yield but a ſcanty increaſe, owing to the ground not being ſufficiently ploughed. The hopes of the year are often blaſted by his cattle breaking through his half-made fences, and deſtroying his grain. His horſes perform but half the labour that might be expected from them, if they were better fed; and his cattle often die in the ſpring from the want of proviſion, and the delay of graſs. His houſe, as well as his farm, bears many marks of a weak tone of mind. His windows are unglazed, or if they have had glaſs in them, the ruins

ruins of it are ſupplied with old hats, or pillows. This ſpecies of ſettler is ſeldom a good member of civil or religious ſociety; with a large portion of an hereditary, mechanical kind of religion, he neglects to contribute any thing towards building a church, or maintaining a regular adminiſtration of the ordinances of the goſpel. He is equally indiſpoſed to ſupport civil government. With high ideas of liberty, he refuſes to bear his proportion of the debt contracted by its eſtabliſhment in our country. He delights chiefly in company, ſometimes drinks ſpirituous liquors to exceſs, will ſpend a day or two in hunting up a newſpaper that contains a political publication, and thus he contracts debts which (if he cannot diſcharge in a depreciated paper currency) compel him to ſell his plantation, generally in the courſe of a few years, to the *third* and laſt ſpecies of ſettler.

This ſpecies of ſettler is commonly a man of property and good character. Sometimes he is the ſon of a wealthy farmer in one of the interior and ancient counties of the ſtate. His firſt object is to convert every ſpot of ground, over which he is able to draw water, into meadow. Where this cannot be done, he ſelects the moſt fertile ſpots on the farm, and devotes them by manure to that purpoſe. His next object is to build a barn, which he prefers of ſtone. This building is, in ſome inſtances, a hundred feet in front,

front, and forty in depth. It is made very compact ſo as to ſhut out the cold in winter, for our farmers find that their horſes and cattle when kept warm, do not require near as much food, as when they are expoſed to the cold. He uſes œconomy likewiſe in the conſumption of his wood. Hence, he keeps himſelf warm in winter by means of ſtoves, which ſave an immenſe deal of labour to himſelf and his horſes, in cutting and hauling wood in cold and wet weather. His fences are every where repaired ſo as to ſecure his grain from his own and his neighbour's cattle. But further; he increaſes the number of the articles of his cultivation; and inſtead of raiſing corn, wheat and rye alone, he raiſes oats, buck-wheat (the phagopyrum of Linnæus) and ſpelts. Near his houſe, he allots an acre or two of ground for a garden, in which he raiſes a large quantity of cabbage and potatoes. His newly cleared fields afford him every year a large increaſe of turnips. Over the ſpring which ſupplies him with water, he builds a milk-houſe. He likewiſe adds to the number, and improves the quality of his fruit trees; his ſons work by his ſide all the year, and his wife and daughters forſake the dairy and the ſpinning-wheel, to ſhare with him in the toils of harveſt. The laſt object of his induſtry is to build a dwelling-houſe. This buſineſs is ſometimes effected in the courſe of his life, but is oftener bequeathed

bequeathed to his ſon, or the inheritor of his plantation; and hence we have a common ſaying among our beſt farmers, "that a ſon ſhould always begin where his father left off;" that is, he ſhould begin his improvements by building a commodious dwelling-houſe, ſuited to the improvements and value of the plantation. This dwelling-houſe is generally built of ſtone; it is large and convenient, and filled with uſeful and ſubſtantial furniture. It ſometimes adjoins the houſe of the ſecond ſettler; but it is frequently placed at a little diſtance from it. The horſes and cattle of this ſpecies of ſettler bear marks in their ſtrength, fat, and fruitfulneſs, of their being plentifully fed and carefully kept. His table abounds with a variety of the beſt proviſions. His very kitchen flows with milk and honey. Beer, cyder and wine are the uſual drinks of his family. The greateſt part of the clothing of his family is manufactured by his wife and daughters. In proportion as he increaſes in wealth, he values the protection of laws. Hence he punctually pays his taxes towards the ſupport of government. Schools and churches likewiſe, as the means of promoting order and happineſs in ſociety, derive a due ſupport from him: for benevolence and public ſpirit, as to theſe objects, are the natural offſpring of affluence and independence. Of this claſs of ſettlers are two thirds of the farmers of Penſylvania.

Theſe

Theſe are the men to whom Penſylvania owes her ancient fame and conſequence.

If they poſſeſs leſs refinement than their ſouthern neighbours, who cultivate their lands with ſlaves, they poſſeſs more republican virtue. It was from the farms, cultivated by theſe men, that the American and French armies were fed, chiefly, with bread during the late revolution; and it was from the produce of theſe farms that thoſe millions of dollars were obtained from the Havanna after the year 1780, which laid the foundation of the bank of North America, and which fed and clothed the American army till the glorious peace of Paris.

This is a ſhort account of the happineſs of a Penſylvanian farmer. To this happineſs our ſtate invites men of every religion and country. We do not pretend to offer emigrants the pleaſures of Arcadia. It is enough if affluence, independence and happineſs are enſured to patience, induſtry and labour. The moderate price of land*; the credit which ariſes from prudence,

* The unoccupied lands are ſold by the ſtate for about ſix guineas per hundred acres. But as moſt of the lands that are ſettled are procured from perſons who had purchaſed them from the ſtate, they are ſold to the firſt ſettler for a much higher price. The quality of the ſoil, its vicinity to mills, court-houſes, places of public worſhip, and navigable water: the diſtance of land carriage to the ſea-ports of Philadelphia or Baltimore, and the nature of

dence, and the ſafety from our laws of every ſpecies of property, render the bleſſings which I have deſcribed, objects within the reach of every man.

From a review of theſe different ſpecies of ſettlers, it appears that there are certain regular ſtages, which mark the progreſs from the ſavage to civilized life. The firſt ſettler is nearly related to an Indian in his manners. In the ſecond, the Indian manners are more diluted. It is in the third ſpecies only that we behold civilization completed. It is to the third ſpecies of ſettlers only, that it is proper to apply the term of FARMERS. While we record the vices of the firſt and ſecond ſettlers, it is but juſt to mention their virtues likewiſe. Their mutual

of the roads, all influence the price of land to the firſt ſettler. The quantity of cleared land, and the nature of the improvements added to all the above circumſtances, influence the price of farms to the ſecond and third ſettlers. Hence the price of land to the firſt ſettler is from a quarter of a guinea to two guineas per acre; and the price of farms is from one guinea to ten guineas per acre to the ſecond and third ſettlers, according as the land is varied by the before-mentioned circumſtances. When the firſt ſettler is unable to purchaſe, he often takes a tract of land for ſeven years on a leaſe, and contracts inſtead of paying a rent in caſh to clear fifty acres of land, to build a log cabin and a barn, and to plant an orchard of two or three hundred apple trees. This tract after the expiration of this leaſe, ſells or rents for a conſiderable profit.

wants

wants produce mutual dependance: hence they are kind and friendly to each other. Their ſolitary ſituation makes viſiters agreeable to them: hence they are hoſpitable to ſtrangers. Their want of money (for they raiſe but little more than is neceſſary to ſupport their families) has made it neceſſary for them to aſſociate for the purpoſes of building houſes, cutting their grain, and the like: this they do in turns for each other, without any other pay than the pleaſures which uſually attend a country frolic. Perhaps what I have called virtues are rather *qualities* ariſing from neceſſity, and the peculiar ſtate of ſociety in which theſe people live. Virtue ſhould in all caſes be the offspring of principle.

I do not pretend to ſay that this mode of ſettling farms in Penſylvania is univerſal. I have known ſome inſtances where the firſt ſettler has performed the improvements of the ſecond, and yielded to the third. I have known a few inſtances likewiſe of men of enterprizing ſpirits, who have ſettled in the wilderneſs, and who in the courſe of a ſingle life have advanced through all the intermediate ſtages of improvement that I have mentioned, and produced all thoſe conveniences which have been aſcribed to the third ſpecies of ſettlers; thereby reſembling in their exploits not only the pioneers and light infantry, but the main body of an army.

There are inſtances likewiſe where the firſt ſettlement has been improved by the ſame family in hereditary ſucceſſion, till it has reached the third ſtage of cultivation. There are many ſpacious ſtone houſes, and highly cultivated farms, in the neighbouring counties of the city of Philadelphia, which are poſſeſſed by the grandſons and great grandſons of men who accompanied William Penn acroſs the ocean, and who laid the foundation of the preſent improvements of their poſterity, in ſuch cabins as have been deſcribed.

I dare ſay this paſſion for migration, which I have deſcribed, will appear ſtrange to an European. To ſee men turn their backs upon the houſes in which they drew their firſt breath—upon the churches in which they were dedicated to God—upon the graves of their anceſtors—upon the friends and companions of their youth—and upon all the pleaſures of cultivated ſociety, and expoſing themſelves to all the hardſhips and accidents of ſubduing the earth, and thereby eſtabliſhing ſettlements in a wilderneſs, muſt ſtrike a philoſopher, on your ſide the water, as a picture of human nature that runs counter to the uſual habits and principles of action in man. But this paſſion, ſtrange and new as it appears, is wiſely calculated for the extenſion of population in America; and to this it contributes, not only by promoting the increaſe of the human ſpecies in new ſettlements, but in the old ſettlements likewiſe.

While

While the degrees of induſtry and knowledge in agriculture, in our country, are proportioned to farms of, from ſeventy-five to three hundred acres, there will be a langour in population as ſoon as farmers multiply beyond the number of farms of the above dimenſions. To remove this languor, which is kept up alike by the increaſe of the price, and the diviſion of farms, a migration of part of the community becomes abſolutely neceſſary. And as this part of the community often conſiſts of the idle and extravagant who eat without working, their removal, by increaſing the facility of ſubſiſtence to the frugal and induſtrious who remain behind, naturally increaſes the number of people; juſt as the cutting off the ſuckers of an apple tree increaſes the ſize of the tree, and the quantity of fruit.

I have only to add upon this ſubject, that the migrants from Penſylvania always travel to the ſouthward. The ſoil and climate of the weſtern parts of Virginia, North and South Carolina and Georgia afford a more eaſy ſupport to lazy farmers, than the ſtubborn, but durable ſoil of Penſylvania.—*Here* our ground requires deep and repeated ploughing to render it fruitful. *There* ſcratching the ground once or twice affords tolerable crops. In Penſylvania the length and coldneſs of the winter make it neceſſary for the farmers to beſtow a large ſhare of their labour in providing for, and feeding their

cattle; but in the ſouthern ſtates, cattle find paſture during the greateſt part of the winter in the fields or woods. For theſe reaſons, the greateſt part of the weſtern counties of the ſtates that have been mentioned, are ſettled by original inhabitants of Penſylvania. During the late war, the militia of Orange county, in North Carolina, were enrolled, and their number amounted to three thouſand five hundred, *every* man of whom had migrated from Penſylvania. From this you will ſee that our ſtate is the great out-port of the united ſtates for Europeans; and that after performing the office of a ſieve by detaining all thoſe people who poſſeſs the ſtamina of induſtry and virtue, it allows a paſſage to the reſt, to thoſe ſtates which are accommodated to their habits of indolence and vice.

I ſhall conclude this letter by remarking, that in the mode of extending population and agriculture which I have deſcribed, we behold a new ſpecies of war. The third ſettler may be viewed as a conqueror. The weapons with which he atchieves his conqueſts, are the implements of huſbandry; and the virtues which direct them, are induſtry and œconomy. Idleneſs, extravagance and ignorance fly before him. Happy would it be for mankind, if the kings of Europe would adopt this mode of extending their territories! It would ſoon put an end to the dreadful connection which has exiſted in every

age

age between war and poverty, and between conqueſt and deſolation.

With great reſpect I have the honour to be

SIR,

Your moſt obedient humble Servant,

PHILADELPHIA,
October 26, 1786. BENJAMIN RUSH.

A PHYSICAL INQUIRY *into the* POWERS *and* OPERATION *of* MEDICINES; *by* THOMAS PERCIVAL, M. D. F. R. S. *and* S. A. *Lond.* F. R. S. *and* R. M. S. *Edinb. &c. &c.*

CAUSA LATET, VIS EST NOTISSIMA.
OVID.

TO THE LITERARY AND PHILOSOPHICAL SOCIETY.

MANCHESTER, NOVEMBER 25, 1786.

MEDICINES are the inſtruments employed for the preſervation of health, or the cure of diſeaſes: It muſt, therefore, be an object of intereſting ſpeculation to the philoſopher, and of practical importance to the phyſician to inveſtigate the rationale of their action on the human body. But there is no branch of

the healing art which is in itself more intricate and obscure; nor any one that has undergone so many doctrinal vicissitudes. It would trespass too much on the time allotted for such discussions, in this Society, to enumerate the multifarious hypotheses which have been supported by the successive sectaries in physic, since the days of Hippocrates. On many of these I have animadverted in a work, published near twenty years ago*. And I shall now only request your candid attention to a few observations, on the opinions which are beginning to prevail in our schools; and your permission to offer some hints towards the extension of our views, and the methodizing of our experience, relative to this curious and philosophical subject.

Anatomy has now revealed the exquisite structure of our corporeal frame; and physiology has taught us that, in its animated state, the organs of which it is composed are reciprocally connected with, and delicately adjusted to each other. The minutest agent, therefore, may excite a movement capable of being propagated to any part of the system, or even through the whole of it, by a sympathetic energy, independent and far beyond the power of the primary instrument of motion. From these premises it is inferred, agreeably to the simplicity which sub-

* Essays Medical and Experimental, vol. I.

sists

ſiſts in all the operations of nature, that a medicine is only the *cauſe of a cauſe*, to adopt a phraſe of the logicians; and that its proper action is confined to the nerves or fibres to which it is immediately applied. When received into the ſtomach, after the firſt impreſſion on the very ſenſible coats of that organ, the nature of it is gradually changed, by the ſolvent powers of the gaſtric juices: Or, if incapable of being digeſted into a mild and nutritious chyle, it is carried through the inteſtinal canal, and ejected as uſeleſs and noxious to the body.

Error may be built on the baſis of acknowledged, if only partial, truth; and is then moſt ſpecious in its form, and moſt authoritative in its influence on the underſtanding. But the impoſition ceaſes when we extend our views. And I ſhall endeavour to ſhew, that the operation of medicines is to be meaſured by a more enlarged ſcale than the foregoing hypotheſis applies to it, or any other which now occurs to my recollection.

I. Medicines may act on the human body by an immediate and peculiar impreſſion on the ſtomach and bowels, either in their proper form; in a ſtate of decompoſition; or by new powers acquired from combination, or a change in the arrangement of their parts. The ſympathy of the ſtomach with the whole animated ſyſtem is ſo obvious to our daily experience, that it

cannot require much illuſtration. After faſting and fatigue, we feel that a moderate quantity of wine inſtantly exhilarates the ſpirits, and gives energy to all the muſcular fibres of the body. It has been known even to produce a ſudden and large augmentation of weight, after much depletion, by rouſing the abſorbent ſyſtem to vigorous action. Such power is peculiar to living mechaniſm; and is properly denominated, by phyſicians, the *Vis medicatrix naturæ*. But apparent as is the ſympathy of the ſtomach, the laws by which it is governed are very inſufficiently underſtood: And we have hitherto learned only from a looſe induction of facts, that the nerves of this delicate organ ſeem to be endued with diverſified ſenſibilities; that impreſſions, made by the ſame or different ſubſtances, have their appropriate influence on different and diſtant parts; and that the ſtomach itſelf undergoes frequent variations in its ſtates of irritability. A few grains of blue vitriol, taken internally, excite inſtantly the moſt violent contractions in the abdominal, and other muſcles concerned in vomiting. A doſe of *ipecacuanha*, as ſoon as it produces nauſea, abates both the force and velocity of the heart, in its vital motions; and affects the whole ſeries of blood veſſels, from their origin to their minuteſt ramifications; as is evident by the paleneſs of the ſkin, under ſuch circumſtances, and by the efficacy

efficacy of emetics in ſtopping hæmorrhages. The head, when diſordered with vertigo, ſometimes derives ſudden relief from a tea-ſpoonful or two of æther, adminiſtered in a glaſs of water. And I have known an inceſſant cough to attack the lungs, in conſequence of the ſtimulus of a pin, which had been unwarily ſwallowed. Of the action of medicines on the ſtomach, under decompoſition or recompoſition, we have an example, familiar to every one, in magneſia. For this abſorbent earth by neutralizing the acid in the *primæ viæ*, acquires a purgative quality, and at the ſame time yields a gas of great ſalubrity, as an anti-emetic, tonic, and antiſeptic.

II. Medicines may paſs into the courſe of circulation in one or other of the ſtates above deſcribed; and, being conveyed to different and diſtant parts, may exert certain appropriate energies. Chemiſtry furniſhes numberleſs caſes wherein ſubſtances undergo changes, and put on new forms more remarkable than can be effected by the digeſtion of the ſtomach, retaining ſtill the *materia prima*, and being capable of reſuming the original arrangement of their particles, and conſequently their original qualities. Now, a body altered in its texture, by the digeſtive organs, and carried into the ſyſtem with the aliment, may by ſuch alteration acquire ſpecific powers on particular ſound or diſ-

eaſed

eaſed parts. Thus, if we ſuppoſe cantharides to be changed in form and texture, when mixed with the chyle, the lymph, or blood, yet in that form and texture they may be peculiarly adapted to excite ſtrangury in the urinary paſſages. Or, we may conceive that this new modification of their corpuſcles may again be altered, and their original compoſition reſtored by a ſubſequent chemical change in the kidneys; an event not more ſingular than the ſeparation of urine from the blood, than the revival of a metal, or the precipitation of a ſolvend from its menſtruum by elective attraction. The urinary excretion ſeems to be deſigned by nature to carry off the recrementitious parts of the circulating fluids. And it clearly ſhews what compoſitions, and decompoſitions take place in the body. For it varies almoſt every hour both in the ſtate of health and of diſeaſe; and the lateritious, pinky, mucous, and other appearances it exhibits, are the reſult of chemical changes, either in itſelf, or in the fluids from which it is derived.

The ſenſible qualities of any body are no certain criteria of its medicinal action. Peruvian bark owes not its efficacy to bitterneſs; for ſtronger bitters are not poſſeſſed of its febrifuge powers. Antimony, though inſipid, is violent in its operation on the nerves of the ſtomach: And yet, if applied to the eye, an organ endued

endued with equal ſenſibility, it is entirely inert. To what property in opium, capable of affecting the external ſenſes, are we to aſcribe its narcotic powers? Or is there in the grateful taſte of *ſaccharum ſaturni* any indication of a deadly poiſon? But the inſtances are numberleſs which may be adduced to prove the uncertainty of reaſoning otherwiſe than from obſervation, concerning the action of medicines, and the peculiar ſenſibility of different parts of our ſyſtem to their impreſſion. Following, therefore, experience as our guide, let us notice ſuch facts as may elucidate the ſubject before us. It is well known that madder root carries its tinging quality to the bones, affecting neither the ſkin, the muſcles, the ligaments, nor fat. Digeſtion conſequently leaves this tinging quality unchanged; or perhaps it is again recovered, when arrived at the bones, by ſome new arrangement of parts produced by the chemiſtry of nature. Extract of logwood, taken internally, ſometimes gives a bloody hue to the urine. But the aſtringency of it does not, according to my trials, accompany its colouring matter*. I recollect no inſtance

* It is ſaid the fruit of the Nopal, or Indian fig, on which the cochineal is propagated, tinges the urine of thoſe who eat it with a deep blood colour. The leaves of this ſhrub are of a permanent and lively green; and it is remarkable that their juices are converted, by the concoctive organs of

ſtance wherein the milk either of a nurſe, or of an animal, was tinged with madder or logwood. This affords ſome preſumption that the pigment does not ſubſiſt, in its proper form, in the blood; but that it is recovered by a ſubſequent change, in the diſpoſition of its conſtituent particles. And if one ſubſtance ſtain the bones, by being carried into contact with them, another may, in a way analogous, produce in them fragility or diſſolution. In the diſeaſe termed by the French *ergot*, and which, with apparent reaſon, is aſcribed to the uſe of a ſpecies of unſound corn, the bones loſe the earthy matter that enters into their texture, and become ſoft and eaſy to be broken. This effect is gradual, and probably ariſes from ſome unknown quality of the corn, which is either not ſubdued by digeſtion, or reſumed in the juices that circulate through the oſſeous veſſels. A change in the proceſs of vegetation may communicate a diſſolvent power to an eſculent ſeed. Muſtard acquires it by its natural growth, and is capable

of the inſect which feeds on them, into a dye exactly ſimilar to that produced by the powers of vegetation in the pulp of the fruit. Cartheuſer obtained from the cochineal a moderately *aſtringent* ſpirituous extract, amounting, in weight, nearly to three fourths of the ſubſtance from which it was prepared. Theſe facts exhibit a ſtriking analogy between digeſtion and vegetation, as the products appear to be the ſame both in colour and quality.

of

of rendering even ivory itſelf ſoft and fragile. How far it would produce ſuch an effect on the bones of a living body, if uſed as the chief article of diet, we have no experience on which to ground any ſatisfactory concluſion. The peaſantry, in the mountainous parts of this county, who live on oat meal, are peculiarly liable to the itch, and to other cutaneous eruptions. Theſe have ſometimes been aſcribed to obſtructed perſpiration. But ſuch obſtruction is itſelf only a concomitant effect of ſome quality in the oat meal injurious to the ſkin.

Sulphur, whether externally or internally uſed, produces a cure in the itch. In each way, therefore, we may preſume its operation to be ſimilar. But when taken into the ſtomach, there can be no doubt that it undergoes a change in the modification of its parts, and that it does not circulate through the blood veſſels either in the form, or with the properties of ſulphur. Yet when conveyed to the ſurface of the body, it appears evidently to recover its original powers; communicating its peculiar odour to the perſpiration, tinging ſilver, and curing cutaneous defœdations*. The ſame holds true of the vitriolic

* Biſhop Watſon, in his Chemical Eſſays, warns thoſe who uſe coſmetic lotions containing ceruſſe, to forbear from them at Harrowgate, Moffat, or other places where they drink ſulphurated waters, "leſt they ſhould be in "the

vitriolic acid, when adminiſtered in large doſes. It ſeems to acquire phlogiſton in the animal body, and to paſs off by the pores, as hepatic air, or as volatilized ſulphur. Even when given to nurſes, it proves an effectual remedy for the itch, both in them, and the children whom they ſuckle. Mercury, combined with ſulphur into an æthiops, has been generally regarded as inert. But inſtances have occurred in which, under this form, though accurately prepared, it has produced ſalivation; an evident proof of a chemical change in the æthiops, by which the mercury was reſtored to its priſtine powers. Indeed the ſame reaſoning may be applied to the ſpecific action of mercury on the ſalival glands, in whatever mode it be adminiſtered*. A ptyaliſm is ſometimes produced by antimony. Dr. James aſſured my friend Sir George Baker, that he knew ſix inſtances of it, occaſioned by his fever powder, although he had left mercury out of its compoſition long before they occurred. But the

" the ſtate of the unlucky fair one, whoſe face, neck, and " arms were ſuddenly deſpoiled of all their beauties, and " changed quite black." Vol. III. p. 365.

* We have the concurrent teſtimony of many authors, that mercury has been found, reſtored to its original form, in the carious bones of their patients. Vid. Joan. Farnel. cap. 7. Gabriel. Fallop. cap. 78. Joan Languem, lib. I. epiſt. 43. Alex. Petrom. cap. 1. lib. VI. &c. &c.

patients,

patients, thus affected, had neither their teeth looſened, nor their breath made offenſive.

Moſt perſons have experienced the effects of aſparagus on the urine*. This takes place very ſpeedily, and ſtrongly too, even though a ſmall quantity only has been eaten. The ſmell is much more diſagreeable than that of aſparagus itſelf. And as the odorous particles conveyed to the kidneys muſt be greatly diluted in their paſſage (even on the ſuppoſition of the retrograde motion of the lymphatics, which does not ſeem probable in a caſe ſo invariable and uniform) I ſhould conceive that a new combination of particles takes place in the urinary organs; and that the odorous part of the ſecretion differs in its form and quality, both from what ſubſiſted in the chyle and in the blood.

There are certain medicines which, when ſwallowed, quickly manifeſt themſelves in the diſcharges, with ſome of their original qualities. Soap lees, when taken in large quantities, render the urine alkaline and lithonthriptic: And the ſame excretion becomes impregnated with fixed air, if mephitic water be drunk freely. A patient, whom I viſit at this time, has ſix

* Cabbage, eſpecially that of the winter's growth, impregnates water with a diſagreeable ſmell, ſomewhat ſimilar to that which is communicated by aſparagus. Yet, I believe, cabbage is never known to taint the urine; perhaps from its having no chemical affinity with it.

grains

grains of the Balſam of Tolu adminiſtered to him thrice every day; and his urine is ſtrongly ſcented, even by this ſmall quantity. Fuller aſſerts of the Balſam of Copaiba, *Urinam odore violaceo minime inficit; illam vero ſapore amaro imbuit.* Garlick affects the breath, though applied only around the wriſts. The milk of a nurſe is, likewiſe, eaſily tainted with it. A purgative given to one who ſuckles will ſometimes produce no operation on her bowels, if ſhe be coſtive, but a powerful one on the child at her breaſt.—But a ſtill more convincing proof that there may be a renovation of the original qualities of a body, after it has undergone the proceſs of digeſtion, and other ſubſequent changes, is deducible from theſe facts; that butter is often impregnated with the taſte and ſmell of certain vegetables, on which the cows have paſtured; that the milk of ſuch cows diſcovers no diſagreeable flavour; neither does the whey nor cheeſe prepared from it. Now butter is formed firſt by a ſpontaneous ſeparation of cream; and ſecondly by a fermentation of it, that is, by a twofold and ſucceſſive new arrangement of its elementary parts. By theſe changes, the original offenſive materials in the food of the cow ſeem to reaſſume their proper form and nature.

After venæſection the ſerum of the blood has ſometimes appeared as white as milk, whilſt the craſſamentum retained its natural colour. This whiteneſs

whiteneſs hath been ſhewn to ariſe from oleaginous particles (not unaſſimilated chyle) floating in the circulating fluids*; and may ſerve to explain a fact, recorded by a writer of good authority, on the natural hiſtory of Aleppo, that "in certain ſeaſons, when oil is plentifully "taken, the people become diſpoſed to fevers "and infarctions of the lungs; which ſymptoms "wear off by retrenching this indulgence†." Some years ago cod-liver oil was annually diſpenſed, amongſt the ſick in our hoſpital, to the amount of fifty or ſixty gallons. The taſte and ſmell are extremely nauſeous; and it leaves upon the palate a ſavour like that of putrid fiſh. This remedy is moſt ſalutary when it operates by perſpiration; and the ſweat of thoſe to whom it is adminiſtered, always becomes ſtrongly tainted with it. An oil of the ſame kind forms no inconſiderable part of the food of many northern nations; and it is ſaid to penetrate and imbue the deepeſt receſſes of the body‡.

In the Philoſophical Tranſactions for 1750, (vol. I. part. II. p. 295.) Dr. Wright relates an experiment to prove that chalybeates do not

* See Hewſon on the Blood, p. 146.

† See Ruſſels Hiſtory of Aleppo.

‡ Oil was formerly adminiſtered in pregnancy, by Sir William Hamilton, and other experienced phyſicians, to promote eaſy delivery: But modern theory has ſuperſeded their obſervation and experience!

enter the blood. He forced a dog, which had faſted thirty-ſix hours, to ſwallow a pound of bread and milk, with which an ounce and a half of green vitriol were mixed. An hour afterwards he opened the dog, and collected from the thoracic duct near half an ounce of chyle, which aſſumed no change of colour when the tincture of galls was dropped into it; though it acquired a deep purple from the ſame tincture, when one fourth of a grain of *ſal martis* had been diſſolved in it. This experiment is uſually deemed deciſive in ſupport of the theory, that chalybeates exert their operations ſolely on the ſtomach; and that the vigour they communicate to the ſyſtem ariſes, excluſively, from their tonic powers on the alimentary canal, and on the ſympathy of the ſtomach with various other parts of the body. I am not inclined to doubt either the tonic action or the ſympathy ſuppoſed; but I ſee not that they preclude the immediate agency of ſteel on remote parts of the human frame. For this remedy, in other forms capable of being introduced into the circulation, may exert conſiderable energy, as deobſtruent, ſtimulant, or aſtringent. And the experiment adduced only evinces, that it did not ſubſiſt in the chyle as a vitriol, qualified to ſtrike a black colour with galls. Neither does the calx of iron, nor the glaſs of iron poſſeſs this power: Yet, though changed, they are both capable of being reſtored

to

to it. Perhaps, with equal reaſon, it might be preſumed, by one ignorant of chemiſtry, that *ſal martis* contains no iron, becauſe it is not acted upon by the load-ſtone.

With the foregoing obſervation of Dr. Wright, I ſhall contraſt thoſe made by the celebrated Dr. Muſgrave, which are alſo recorded in the annals of the Royal Society. "I injected," ſays he, "into the *jejunum* of a dog, that had, for a "day before, but little meat, about twelve "ounces of a ſolution of indigo in fountain "water, and after three hours opening the dog "a ſecond time, I obſerved ſeveral of the lac-"teals of a bluiſh colour, which, on ſtretching "the meſentery, did ſeveral times diſappear, "but was moſt eaſily diſcerned when the me-"ſentery lay looſe, an argument that the bluiſh "liquor was not properly of the veſſels, but of "the liquors contained in it. A few days after "this, repeating the experiment in another com-"pany, with the ſolution of ſtone blue, in foun-"tain water, and on a dog that had been kept "faſting thirty-ſix hours, I ſaw ſeveral of the "lacteals become of a perfect blue colour within "very few minutes after the injection. For they "appeared before I could ſew up the gut.

"About the beginning of March following, "having kept a ſpaniel faſting thirty-ſix hours, "and then ſyringing a pint of deep decoction of "ſtone blue, with common water, into one of

" the ſmall guts; and after three hours opening " the dog again, I ſaw many of the lacteals of a " deep blue colour, ſeveral of them were cut, " and afforded a blue liquor, ſome of the decoc- " tion, running forth on the meſentery. After " this I examined the *ductus thoracicus*, (on which, " together with other veſſels near it, I had on " my return made a ligature) and ſaw the *recep-* " *taculum chyli*, and that *ductus* of a bluiſh colour; " not ſo blue indeed as the lacteals, from the ſo- " lution mixing, in or near the *receptaculum*, with " *lympha*; but much bluer than the *ductus* uſed " to be, or than the lymphatics under the liver, " with which I compared it, were*."

Stone blue is a preparation of cobalt, pot-aſh, and white lead; which, being converted into glaſs, is ground into a fine powder. And if ſuch a ſubſtance can pervade the lacteals, we may conclude that they are permeable to other bodies, beſides thoſe deſigned for nutrition, and capable of aſſimilation with the blood. This argument, from analogy, receives great additional force from the known fact that mercury, and various other active remedies, may be conveyed into the body through the abſorbents of the ſkin, a ſyſtem of veſſels, ſimilar to thoſe above-mentioned, in their ſtructure, uſes, and termination. In a caſe of *hydrocephalus internus*, on which I

* See Philoſoph. Tranſ. abridged by Motte, chap. IV. part II. p. 76.

have

have lately been consulted, a child under one year of age received, by successive frictions, four ounces, six drachms, and two scruples of the *unguentum cæruleum fortius*, between the eighth of February and the seventh of April 1786. One scruple was administered each time; the operation took up more than half an hour; and the part, to which the ointment was applied, was always previously bathed with warm water; precautions which seemed to secure the full absorption of the mercury*. I should not omit to mention that the child recovered without any symptoms of salivation, and continues perfectly well. Indeed I have repeatedly observed, that very large quantities of the *unguentum cæruleum* may be used in infancy and childhood, without affecting the gums, notwithstanding the predisposition to a flux of saliva, at a period of life incident to dentition. The practicability of curing the *hydrocephalus internus* is a late and happy discovery; and perhaps the peculiar efficacy of quicksilver, in this alarming dis-

* Thirty-seven grains of calomel were given internally, during this space of time, at proper intervals, and in sixteen doses. The case referred to occurred in London, and was under the immediate direction of several physicians of eminence. The use of mercury was adopted by my advice; and the estimate of the quantity consumed, as made by the apothecary, has been transmitted to me by G. H. Esq. the father of the child.

caſe, may reflect ſome light on the general rationale of its action. The ſtructure of the brain is yet very imperfectly known; but anatomiſts have ſufficiently aſcertained, that it is moſt copiouſly ſupplied with veſſels of every order, ſo that about one tenth of the whole maſs of blood circulates within it, although the weight of the encephalon does not exceed one fortieth part of the whole body*. On this large ſyſtem of veſſels, mercury may be preſumed to act with a force proportionate to its magnitude and extent. And, in the inſtances when no ſalivation takes place, it is not unuſual for profuſe ſweatings to occur about the head. An acceleration of growth, alſo, to an extraordinary degree, is frequently obſerved, after the diſeaſe has been thus ſubdued. In one caſe, which fell under my direction in 1784, a young lady, nine or ten years of age, of a noble family in this county, increaſed in ſtature, two inches, within the ſpace of four months, ſucceeding her recovery.

Whence is it that a medicine, ſo irritating as mercury, can be conveyed into the courſe of circulation, when even milk, or the mildeſt liquors, if transfuſed into the blood veſſels, have been found to produce convulſions and death? Is it that what paſſes by the lymphatics or lacteals

* See Monro on the ſtructure of the nervous ſyſtem, p. 3, folio.

is

is carried into the thoracic duct, and there mixed with a large portion of the chyle and lymph, by which its acrimony is sheathed and diluted, or its chemical properties changed, before it enters the mass of blood? For the absorbents of the skin, and of the intestines, should seem to require a capacity to bear the stimulus of those extraneous bodies to which, in both situations, they are exposed.

III. Medicines introduced into the course of circulation may affect the general constitution of the fluids; produce changes in their particular qualities; superadd new ones; or counteract the morbific matter, with which they may be occasionally charged. By observations on the hæmorrhages, which have been sustained without destruction to life; from experiments made on animals, by drawing forth all their blood; and by a compution of the bulk of the arteries and veins*; the mass of circulating fluids has been estimated at fifty pounds, in a middle-sized man; of which twenty-eight pounds are supposed to be red blood. Fluids, bearing so large a properties to the weight of the whole body, have assuredly very important offices in the animal œconomy. Endued with the common properties of other fluids, they are subject to *mechanical laws*; being variously compounded,

* Vid. Halleri Prim. Lin. sect. CXLIX.

they are incident to *chemical* changes; and, as they are contained in a living vaſcular ſyſtem, their motions become ſubject to the influence of nervous energy.

But the proſecution of this ſubject will exceed the bounds of the preſent evening's diſcuſſion: And I ſhall reſerve what I have further to advance upon it to ſome future meeting of the Society.

Observations *concerning the* Vital Principle; *by* John Ferriar, M. D.

READ FEBRUARY 7, 1787.

Quibus ipſis noſtrum (ſc. humanum) ingenium optimè poteſt cognoſci, quod vilia, ſenſibus obvia et facilia, ac ſimpliciſſima deſpicit; ad ignota vero, obſcura et magnifica magno impetu fertur. Hoffman.

PHILOSOPHERS have generally ſuppoſed the human body to poſſeſs a living power, independent of the mind. This opinion aroſe at a very early period, and prevailed, with little interruption, till the origin of the eclectic philoſophy; the revival and confirmation of the doctrine have been attempted, by ſome eminent phyſiologiſts of our own times. The doctrines of pneumatology have, indeed, little influence on

on medical theories at preſent, but the opinion of a vital principle is chiefly directed, to explain thoſe actions of the living body, both in health and diſeaſe, which become the moſt important objects of a phyſician's attention; and as it ſeems calculated to reſtore the theory of occult qualities, under the ſpecious title of principles, ſhould it extend itſelf among perſons leſs enlightened than its preſent defenders, a view of its foundation, and its connection with facts, becomes deſirable.

The immateriality of the ſoul was admitted by moſt of the ancient philoſophers*, but the reciprocal action of the ſoul and body on each other, in the phænomena of ſenſation and voluntary motion, were not eaſily explained on that ſuppoſition. To get rid of this difficulty, Plato, improving perhaps on the opinion attributed to Pythagoras†, propoſed that of a plaſtic nature, incorporeal indeed, but without conſciouſneſs‡, and forming the medium between the ſoul and body. This doctrine appears to have been variouſly modified by different ſects, but believed, to a certain extent, by all till the time of Ariſtotle. Mr. Barthez, in his learned

* That is its diſtinction from matter, though not in the ſenſe of the modern immaterialiſts.

† Of an Anima Mundi, from which the ſouls of men were emanations. Vell. in Cic. de Nat. Deor.

‡ Cudworth's Intellect. Syſt. p. 158, 165, 166.

treatiſe

treatiſe on this ſubject, alledges that the Stoics held the exiſtence of a vital principle*. Ariſtotle is repreſented, by ſome†, as following the Platonic theory, becauſe he diſtinguiſhed the mind into the *intellectus agens et patiens*; but he is vindicated againſt former aſſertions of the ſame kind, by Sennertus‡, who explains his meaning to be, that the mind operates in two diſtinct ways, in conſequence of being affected by two diſtinct claſſes of perceptions; conſequently, that the diſtinction implies only a *differentia in anima: Intellectum agentem et patientem non realiter et eſſentialiter, ſed ratione tantum diſtingui.* It appears, however, that moſt of the Peripatetics underſtood Ariſtotle's expreſſions in a ſenſe favourable to the plaſtic nature. Phyſicians had always admitted the exiſtence of the vital principle, under the title of the *calidum innatum*‖. Some of the firſt reſtorers of letters alſo, adopted this opinion, with different modifications§; and during a conſiderable part of the laſt century, a regular ſyſtem

* Nouv. Elem. de L'Homme. C. II.

† Cudworth, p. 165. & ſeq.

‡ Sunt plurimi, qui intellectum agentem, vel deum, vel alium aliquem demonem ſeu intelligentiam, homini aſſiſtentem ſtatuunt. Verum enimvero et ab Ariſtotele et a veritate horum opinio aliena videtur. Epit. Phyſic. p. 82.

‖ Sennert. ſub titulo. Barthez Nouv. Elem. chap. II.

§ Vid. Brucker. Hiſt. Crit. Philoſ. T. V. p. 50, 136, 943.

prevailed,

prevailed, by which the vital principle was reckoned the efficient cauſe of generation and exiſtence, in all animals and plants. It then took the name of the *anima vegetans**. Paracelſus changed this term, in his philoſophy, for that of ſidereal ſpirit, which he believed to be equally independent of the body and the mind†, and to deſcend from the firmament, as the rational ſoul proceeded from the Deity‡. This doctrine was very ſerviceable to the demonologiſts‖. Van Helmont, among other improvements of the Paracelſian ſyſtem, ſuggeſted the theory of the Archëus, without venturing to aſſert the unity of the rational and living ſouls§. The actions of the Archëus were afterwards reduced, by Stahl, to operations of the rational ſoul; but Deſcartes appears to have been the firſt modern philoſopher, who rejected the ſeparate exiſtence of the vital principle, under all denominations¶. He availed himſelf of the progreſs which was made in the nervous phyſiology not long before, by Willis and others, to form an hypotheſis of the vital functions, founded on the ſuppoſition of the

* Alſted. Encyclop. T. I. p. 603.

† Brucker. T. V. p. 324. ‡ Id. IV.

‖ Mor. Antid. adv. Atheiſmum. Glanville's Conſiderations.

§ Barthez, chap. I. He ſets Lord Verulam at the head of the modern ſupporters of the vital principle, p. 23.

¶ Id. p. 16.

nervous

nervous fluid, or animal ſpirits, in the language of that time*.

The doctrine of Stahl made very conſiderable progreſs. Cudworth, from his anxiety to reduce every thing to the Platonic ſyſtem, attempted to ſhew a ſimilarity between the Archëus and the Plaſtic power†; he was a true believer in the independent principle. But the ſuppoſition of a rational power, which, according to the chemiſts, originally formed the body, and afterwards directed all its actions, in health and diſeaſe, does not agree with Cudworth's own account of the plaſtic nature, which he acknowledges to be deſtitute of conſciouſneſs‡. Willis undoubtedly ſupported the notion of an *anima vegetans*‖; but the oppoſers of Stahl were not uniform in their ſentiments. The mechanical phyſicians paid little attention to this queſtion, and for a long time the terms of nature, ſenſitive ſoul, and vital principle were employed, without much diſcuſſion, conſequently, with little clearneſs of apprehenſion. The exiſtence of a nervous fluid was now aſſumed, independently of the ſenſitive ſoul, to explain the appearances of ſenſation and volun-

* Brucker. T. IV. p. 324

† Intellectual Syſtem, p. 167.

‡ Id. p. 158.

‖ Barchuſen. Hiſt. Med. ſub tit. Willis.

tary

tary motion*. At length, Dr. Haller, aſſerted an inherent power of contraction in muſcular fibres†, without excluding any other principle of motion, in which he was followed by Dr. Gaubius‡. About the ſame time Dr. Whytt of Edinburgh attempted a reformation of the Stahlian doctrine‖, to the excluſion of the independent living principle. He ſuppoſed, however, with Stahl, the vital, and other involuntary motions to have been produced, at firſt, by an effort of the will, but to have become mechanical, like the common actions of many voluntary muſcles, in conſequence of habit. This doctrine was partly oppoſed to the pre-eſtabliſhed harmony of Leibnitz§; for it is obſervable, that the balance of rectitude in reaſoning is commonly preſerved, by oppoſing, to the exceſs of any opinion, the exceſs of its contrary.

Some philoſophers began at length to imagine that matter might acquire vitality, in conſe-

* Hoffman, Proleg. C. III. De Secr. fluid. tenuiſſ. L. I. S. 3.

† Phyſiolog. T. I. p. 465. ‡ Pathol. S. 170.

‖ Eſſay on the Vit. and Invol. Motions.

§ This is the ſum of Leibnitz's theory; anima ſuas ſequitur leges, et corpus itidem ſuas: conveniunt vero inter ſe, vi harmoniæ inter omnes ſubſtantias præſtabilita, quoniam omnes ſunt repreſentationes univerſæ.

BRUCKER, T. V. p. 422.

quence

quence of a certain organization*. But while no ſingle hypotheſis reſpecting the vital principle prevailed generally, two theories appeared, which engaged attention by the eminence of their authors, as well as by their own nature. Dr. Monro accounts for the commencement of the involuntary motions, and ſome other phænomena, on the ſuppoſition of a living principle, pervading the univerſe†; ſimilar, I apprehend, to the plaſtic nature of the Platoniſts. Mr. Hunter attributes to the blood, a power of forming and renewing parts, by its proper efforts, apparently carried, in ſome caſes, almoſt to a degree of rationality‡. It is ſufficient to prove the great differences among modern phyſiologiſts, on this ſubject, to obſerve, that while Dr. Hoffman has diſtinguiſhed, in very ſtrong terms, between the ſenſitive and rational ſouls‖, Dr. Cullen allows, that

* Hoffman, T. I p. 18. Buffon, Hiſtoire Naturelle

Since this Eſſay was written, Dr. Fordyce has attempted to account for muſcular motion on the theory of a peculiar attraction, which he terms the *attraction of life*. But, as I had occaſion to obſerve elſewhere, there is too much deſign in muſcular action to be mechanically explained, nor would our perplexity be at all diminiſhed, by receiving an explanation which is fully as obſcure as the cauſe of the phænomena to which it relates.

† Obſerv. on the Nervous Syſtem, p. ult.

‡ Med. Commentaries, vol. II. p. 198.

‖ Magna utriuſque eſt differentia, et diverſa plane ratio; ideoque deoque ambo non pro uno eodemque habenda . . . ſed probé

that this distinction is only nominal, or, as Sennertus expresses it, a *differentia in anima**.

Two general reflections occur, on this imperfect view of the progress of opinions respecting a vital principle; that the chief difficulty consisted, in the persuasion that matter is totally inert, and insusceptible of sensitive life, by any organization, which Hoffman justly calls *infelicissimum dogma*†; and that systematic distinctions, in this, as in other cases, have been mistaken for essential differences.

Accordingly, inconsistences are to be found in several of these opinions; thus Dr. Haller assigns two distinct powers, the *vis nervea*, and *vis insita*, for producing the simple action of one muscle; and though the nervous system is generally allowed to be the medium of sensation and voluntary motion, yet Dr. Gaubius has contrived to exclude this vehicle of the living power from the title of the vital solids; *Vis vitalis solidi est, qua id ad contactum irritamenti se contrahit, crispat.* It is well known that the nerves have no power of contraction. Gaubius must have supposed the existence of a nervous fluid to be granted, in forming this definition, for it does not appear,

probé ratione diversarum operationum, quæ discrepantem etiam essentiam produnt, sunt distinguenda. T. I. p. 88.

* Instit. of Med. sect. XCVII.

† Proleg. cap. III.

from

from other parts of his Pathology, that he meant to exclude the nervous ſyſtem. Dr. Haller's theory of the *vis inſita* was formed from a variety of experiments on living animals, by which he found the irritability of muſcles to remain, long after their connection with the brain was deſtroyed*. But the experiments of Dr. Monro†, Dr. Whytt‡, and Dr. Smith‖, prove that there is no real diſtinction between the *vis inſita* and the nervous energy. This diſpute is ſo well known, that a particular account of the arguments and experiments is unneceſſary; and ſome of the ſtrongeſt will be produced in the courſe of our inquiry. Galen, from ſimilar obſervations with Dr. Haller, had drawn the ſame concluſion with reſpect to the motion of the heart§.

Dr. Whytt, with an inaccuracy ſurprizing in ſo acute a phyſiologiſt, ſuppoſes the ſoul to be preſent in different parts of the brain at the ſame time, while he conſiders the ſoul as immaterial and unextended¶. Nay, he aſſerts that when contraction takes place, on the irritation of a ſeparated muſcle, the action happens from the influence of part of the ſoul contained in the ſeparated part**. Yet he complains that Dr.

* Phyſiolog. T. I. p. 426 to 466. Id. T. IV. p. 516.

† Obſ. on the Nerv. Syſt.

‡ Obſ. on Irritab. and Senſib. p. 310, (of the Quarto edit.)

‖ Differt. Inaugural.

§ Van Swieten Comment. T. I. p. 3, 4.

¶ Vit. & Inv. Mot. p. 202.

** Ib.

Haller

Haller charges him with making the ſoul diviſible. Dr. Whytt admits, alſo, contrary to experiments, the Stahlian doctrine of univerſal ſenſation*; a doctrine clearly diſproved, by the effect of ligatures, or diviſion of nerves, in the living animal. While he combats the *vis inſita*, he produces ſome facts which contradict his own theory of the involuntary motions, and ſeem to ſhew, that the motions of thoſe organs may be explained from the ſtimulus of the contained fluids. Thus, the power of ſtimuli applied to any muſcular part, even to a voluntary muſcle, is greater than the power of the will over that part†, and the periſtaltic motion of the inteſtines ſometimes continues, after the action of the heart has ceaſed‡, from the ſtimulus of their contents. And Dr. Whytt is obliged to confeſs, that the mind has no concern, as a rational agent, with the coaleſcence of the *ductus arterioſus & ductus venoſus* after birth§; for the mind is not even conſcious that ſuch parts have ever exiſted, and their circumſtances are only known by anatomical inveſtigation.

Dr. Monro explains his opinion of the *intellectus agens*, in the human body, in theſe few

* Ib. p. 128. † Ib. p. 14.

‡ Ib. p. 192. Dr. Haller ſays, *Vox (vis vitalis) non perinde placet, cum vis noſtra vitæ aliquantum ſupervivat.* Phyſiolog. T. IV. p. 464.

§ Vit. and Inv. Mot. p. 169.

words; "that the power which created all things, "which gave life to animals, and motion to the "heavenly bodies, continues to act upon, and to "maintain all, by the unceasing influence of a "living principle pervading the universe, the "nature of which our faculties are incapable of "duly comprehending*." But this theory seems liable to the same objection with the notion of a plastic power; that neither of them affords a satisfactory explanation of the phenomena of sense and motion. For the plastic power, or living principle, must be either material or immaterial: if it be material, then it must be allowed that matter, as matter, is susceptible of life; now as the existence of the plastic power is merely assumed, we have a right, in this case, to suppose that the body acquires vitality by a certain degree of organization, as a preferable hypothesis. But if the plastic power be declared immaterial, its action on matter is as difficult to be conceived, as the action of an immaterial mind on the body, and consequently nothing is gained but a term by the supposition. If the living power be supposed to be an immediate act of the Deity, an opinion which has been held by many philosophers†, this is liable to still stronger ob-

* Conclusion of Obs. on the Nervous System.

† Sennert. Epitom. Phys. p. 82. Alsted. Encyclop. p. 530.

jections;

jections; for the conſequence would be, as it is urged by one of Cicero's ſpeakers, *cum miſeri animi eſſent, quod pleriſque contigerit, tum Dei partem eſſe miſeram, quod fieri non poteſt**. If it be ſaid that the living principle, on this hypotheſis, is the connecting medium between the mind and the body, this ſuppoſes the Deity to act ſubordinately to the human mind, which cannot be admitted.

When Mr. Hunter's doctrine of the life of the blood was firſt propoſed, it was ſaid to be a revival of an opinion ſuggeſted by Dr. Harvey†. A very ſimilar theory, however, prevailed long before Dr. Harvey: Galen made the heart the ſeat of the *calidum innatum*, and Sennertus expreſsly ſays, that the heart and arteries form and contain the vital power‡. Since the time of Dr. Harvey, the life of the blood has been aſſerted by ſeveral authors of eminence. Willis ſays, *Sanguinis animationem, non ſolum placita philoſophorum, ſed indubitata ſacræ ſcripturæ teſtimonia plané aſſerunt*§. Hoffman employs the ſame argument to prove the ſame aſſertion, and he elſewhere expreſsly

* De Nat. Deor.

† Medical Comment. vol. II. p. 198.

‡ Inſtit. Med. p. 338. Nothing could have prevented this able writer from attributing life to the blood itſelf, but his belief in the common perſuaſion, that the right ventricle of the heart contained air alone.

§ De Mot Muſc. p. 71.

mentions that the blood contains the vital principle* The ſame opinion may be found in practical authors, particularly in Huxham,† who even mentions the red globules as the peculiar ſeat of life.

Mr. Hunter is ſaid " to conſider a muſcle cut " out of the body to be alive as long as it con- " tinues capable of being acted upon by ſtimuli " of any kind‡;" and to be of opinion, " that " the particular parts of an animal body have a " principle of life, independent of the effect " which ariſes from their union as one ſyſtem‖." The proof of theſe propoſitions, it will be readily ſeen, is included in that of the particular doctrine they are advanced to ſupport.

Mr. Hunter " alledges that, in the nature of " things, there is not a more intimate connection " between life and a ſolid, than between life and " a fluid §;" this argument is inconcluſive; for we cannot, *a priori*, aſcertain the degree or ſpecies of organization requiſite to a vital part.

Mr. Hunter's firſt direct proof of the life of the blood is, that it unites living parts when effuſed between them¶. That living parts unite, in ſome caſes, in conſequence of mutual con-

* Tom. I. p. 33. † Eſſay on Fever.
‡ Medical Comment. ubi ſup.
‖ Ib. p. 199. § Id. Ib.
¶ Medical Comment. ubi ſup.

tacts,

tact, is certain; but it is by no means certain that this union is effected by an interposed fluid*, because the phænomenon admits of a more probable explanation, which comes under the next observation.

The second direct proof of the life of the blood† is, that the blood becomes vascular, like other living parts: and "Mr. Hunter has a preparation, "in which he thinks he can demonstrate vessels "rising from the centre of what had been a "coagulum of blood, and opening into the "stream of the circulating blood‡." That such an effort should take place, in the centre of an effused fluid, not affected by external impulse, is inconceivable, except on the supposition that the blood is a rational as well as a living fluid, and possessed of muscular fibres, or some similar organs. And granting the blood to be rational, it is much more likely that the first attempt towards a reunion of separated parts should be made at the orifices of the divided vessels where the operation would be easiest, than in the centre of the fluid effused between them; that is, there will be an elongation of the divided vessels. And that this does actually take place, appears from Dr. Mon-

* It is well known that if the opposite branches of two healthy trees be tied together, they will coalesce, although no incision had been made in either, nor any part of their bark removed.

† Ib. p. 200. ‡ Id. Ib.

ro's experiments on this ſubject*; in Dr. Monro's plates, the new veſſels are evidently of larger diameter where they join the divided veſſels than in the centre of the newly formed part; nay, in a newly formed piece of ſkin, in plate 46th, the new veſſels, inſtead of proceeding from a com-com point, come in, tapering from the ſides, to form a circle round the centre.

The third direct proof of the life of the blood† is, that its temperature, as it flows from the vein, is always equal, in the moſt oppoſite temperatures to which the body can bear expoſure. This certainly proves the power generally aſcribed to the living body, of preſerving its own temperature, to a certain degree, notwithſtanding the action of external heat or cold, but till the action of the veſſels in this caſe can be done away, the fact will furniſh no excluſive evidence in favour of the life of the blood.

Mr. Hunter's fourth direct argument is, that blood is capable of being acted upon by a ſtimulus‡; the proof of which is, that "blood coagu-"lates from expoſure, as certainly as the cavity "of the thorax or abdomen inflames from the "ſame cauſe‖." But as the ſpontaneous ſeparation of the conſtituent parts of the blood may be

* Obſervations on the Nervous Syſtem, p. 86.

† Med. Com. p. 200.

‡ Med. Com. p. 201. ‖ Ibid.

very

very well explained on mechanical and chemical principles, it is unphiloſophical to recur to any others, and in fact the life of the blood muſt be taken for granted, before this phænomenon can be referred to it: for we might with equal probability aſcribe the freezing of water to a living power. If the blood, in caſes of violent inflammation, be later in coagulating than the blood of healthy perſons*, it is readily explained by the more intimate mixture of the parts of the blood, effected by the increaſed action of the veſſels, which prevents the difference of the ſpecific gravity of each part from acting ſo ſpeedily as uſual.

The fifth direct proof is, the nouriſhment and preſervation of life in paralytic limbs†. In reply to this it may be obſerved, that the continuance of circulation in a paralytic limb may be explained on common principles, therefore the the introduction of a new power, to account for the phænomenon, is unneceſſary. The explanation to which I allude, is derived from the ſtimulus of the blood (which does not imply its life) exerted on the containing veſſels; from the impulſe given by the vis a tergo, and from the ſympathy which prevails, through the arterial ſyſtem, among the contracting fibres of the

* Ibid. † Id. Ibid.

veſſels*. Beſides, the experiments of Dr. Langriſh and Dr. Schwenke prove that tying up the artery of a limb does not prevent the motion of the limb; now by the conſent of all ſupporters of a vital principle, the character of that principle is, that it enables a muſcle to contract; but in this caſe a limb is moved long after circulation is ſtopped in it; the blood therefore does not appear to contain a vital principle. "Dr. Langriſh tied up, and cut aſunder, the carotid and both the crural arteries of a dog, without deſtroying the motion of any muſcle; and Dr. Schwenke aſſures us, that, after having tied up the crural arteries of a dog cloſe to the groin, the animal continued to move his leg and foot for a whole day†."

While the particular doctrines of the vitaliſts are expoſed to theſe objections, ſome direct arguments may be brought againſt the general ſuppoſition of an independent living principle: the arguments are of two kinds; refutations of the general proofs offered in ſupport of the vital principle, and inſtances of the direct influence

* This ſympathy is moſt obſervable in diſeaſes. Spaſmodic affections of the heart are often attended with ſhooting pain in one or both of the humeral arteries. To this cauſe the pain felt in one arm, in caſes of hydrothorax, muſt probably be aſcribed.

† Whytt, Vital and Invol. Motions, p. 6.

of

of the mind and brain over what is termed the independent living principle.

The proofs moſt ſtrongly inſiſted on, for the ſupport of the vital principle, are, the contraction of muſcles ſeparated from the body, on the application of ſtimulants*; the performance of the vital and involuntary motions, without any exertion or even conſciouſneſs of the mind†; and the birth of full-grown fœtuſes deſtitute of a brain‡. In all theſe caſes, ſomething is alledged to operate, independently of the mind, in producing muſcular motion.

In anſwer to the firſt argument, drawn from the contraction of ſeparated muſcles, it may be ſaid,

1. That the power of contraction, in a ſeparated muſcle, is loſt before putrefaction takes place‖, that is, before its texture is deſtroyed; but if its vitality depended on its texture, this ought not to happen.

2. The power of contraction, in a ſeparated muſcle, is ſtrongeſt upon its firſt ſeparation, and becomes weaker by degrees§; therefore the contracting power appears to have been derived

* Haller. Elem. Phyſ. tom. I. p. 462.

† Monro's Obſ. on the Nerv. Syſt. p. 102.

‡ Id. p. 26.

‖ Haller. The power of contraction is loſt in man, in a very few hours; in cold-blooded animals, within twenty-four hours.

§ Whytt.

from

from ſome ſource from which it is detached by the exciſion of the part.

3. Irritation of the medulla oblongata, or of the nerves ſupplying particular muſcles, occaſions ſtronger contractions than irritation of the muſcles themſelves*. The ſame author to whom I owe this obſervation, furniſhes an experiment, directly proving that the action of ſeparated muſcles depends upon the nervous energy. "Five "minutes after taking out the heart of a frog, "I injected a ſolution of opium into its ſtomach "and guts. In leſs than half an hour it ſeemed "to be quite dead; for neither pricking nor "tearing its muſcles produced any contraction "in them, or any motion in the members to "which they belonged. After cutting off its "head, a probe puſhed into the ſpinal marrow "made its fore-legs contract feebly†." Here, in an animal ſo tenacious of life, as commonly to hop about vigorouſly long after the heart is taken out, or the head cut off, the irritability of the muſcles, or, in other words, the living principle, is deſtroyed by the application of opium to the ſtomach and inteſtines. Now, circulation being previouſly ſtopped, by taking out the heart, the opium could only act on the nervous ſyſtem, which was ſtill entire, and the nervous power being deſtroyed by the opium,

* Whytt Vit. and Inv. Mot. p. 10.

† Obſ. on Irrit. and Senſ. Exp. II. p. 310.

the

the irritability of the muſcles, that is, the living principle, is alſo deſtroyed, and their deſtruction is ſimultaneous. The laſt part of the experiment proves their identity, when the irritability of the muſcles is reſtored, by exciting the ſmall remainder of nervous energy contained in the ſpinal marrow.

4. Dr. Haller himſelf is obliged to make a conceſſion, on this ſubject, ſufficient to deſtroy his favourite hypotheſis of the vis inſita* : *Adparet cauſam motus equidem per nervos dimitti, cæterum quæcunque ea cauſa ſit, aliquamdiu tamen in nervo integram et efficacem ſupereſſe,* " *etſi nervus a cerebro ſeparatus eam cauſam nuper non accepit.*" The permanency of the cauſe of motion, after the ſeparation of a muſcle from the ſource of that cauſe, may be well illuſtrated, by the duration of impreſſions on our ſenſes, after the exciting cauſe is removed; as in the experiment always quoted to this purpoſe, of the circular appearance of an ignited body kept in rotatory motion.

5. When a paralytic limb is convulſed by the electric ſhock, the motion never takes place without the patient's conſciouſneſs. In this caſe there is no diſtinction between the vital principle and that exertion, which, in voluntary motion, is always attributed to the mind.

* Phyſiolog. tom. IV. p. 338.

In

In anſwer to the ſecond argument in favour of a vital principle, drawn from the performance of the vital and other involuntary motions, I ſhall content myſelf with obſerving at preſent, that allowing the organs of thoſe motions to be ſupplied with nervous energy, which cannot be denied, their motions may be very well accounted for, by the ſtimulus of their contained fluids*. It may be added, that the principal nerves of the heart and lungs are chiefly ſent from the brain: this circumſtance, as the parts are ſituated very near the ſpine, and at a conſiderable diſtance from the brain, is a little puzzling to the vitaliſts.

The force of the third argument, drawn from the want of a brain in full grown fœtuſes, is taken off by Dr. Whytt, who remarks, that as the heart is ſometimes wanting in full-grown fœtuſes, the argument would equally prove, that the heart is not neceſſary for the continuance of circulation, as that the brain is not neceſſary to the ſupport of the ſyſtem. Accordingly, fœtuſes born without a brain do not generally ſurvive birth†. Dr. Haller ſuppoſes, with great probability, that in theſe caſes the brain is not wanting originally, but is deſtroyed by diſeaſe, during the growth of the fœtus.

* See page 6.

† Haller. Phyſ. tom. IV. p. 356.

Beſides

Beſides the general ſuppoſition of an independent living principle, an inference has been drawn, from the facts we have noticed, of a nervous energy, independent of the brain. It may therefore be proper to explain the ſenſe in which the uncertain term of nervous energy is employed in this eſſay, leſt it ſhould be confounded with the notion of a vital principle. By this term then, I mean that condition, derived from the brain, to different parts of the body, by means of which they become capable of motion. In this definition I allude to no theory reſpecting the nature of the ſoul, nor reſpecting the ſpecific nature of the nervous energy, but confine the terms to facts. The proof of the definition will appear, from the arguments I am going to mention.

To ſhew, by direct proof, that there is no independent vital principle, I would obſerve,

1. That it is juſtly urged by Dr. Monro * againſt the doctrine of the vis inſita, that there is too much deſign in the actions of different muſcles, affected by different ſtimuli, to be the effect of mere mechaniſm. This argument is ſtrongly againſt the exiſtence of a vital principle. Thus, when the hand or foot is burnt, or otherwiſe ſuddenly injured, the muſcles on the part immediately ſtimulated are not thrown into

* Obſervations on the Nerv. Syſt. p. 95 to 99.

action,

action, nor the muſcles on the ſide irritated; but their antagoniſts contract immediately and ſtrongly *: if the back of the hand, for inſtance, be ſuddenly irritated, the extenſors of the hand are not affected, but the flexors are thrown into inſtant and violent action, to remove the limb from the offending cauſe. Now if the inſtantaneous action be, in this caſe, chiefly produced by an effort of the mind, the ſuppoſition of a diſtinct vital principle is ſuperfluous; if it be ſaid to be produced by the living power indedendent of the mind, then there muſt be a rational power in the body, independent of the mind, which is abſurd.

2. The ſtate of the vital and involuntary motions is conſiderably affected by the ſtate of the mind. Reſpiration is, to a certain degree, under the direction of the will: the action of the heart is very quickly and powerfully varied by the workings of the paſſions; and even the ſecretions are frequently changed, in quantity and quality †, by the ſame cauſe. But farther, theſe motions are often ſuſpended by a ſudden affection of the mind, as in the caſe of fainting, which is produced very commonly by an impreſſion made on the mind, without the ſuſpi-

* Whytt, Vit. and Inv. Mot.

† The bite of an enraged man has been known to prove fatal, in conſequence of the poiſonous quality of the ſaliva. HOFFMAN, tom. I.

cion

cion of any bodily cauſe; and the impreſſion is ſometimes ſo powerful as to put an entire ſtop to the vital motions, and thus produce death. Again, organic leſions of the heart and lungs have been obſerved to take place from extremes of paſſion; and particularly, in Meſmer's operations of animal magnetiſm, ſeveral perſons ſpit blood by the mere ſtrength of imagination*. All theſe facts equally diſprove the exiſtence of a ſeparate vital principle, and prove the dependance of the nervous energy upon the brain.

3. It is acknowledged, that in maniacal caſes, the principal part of the diſeaſe conſiſts in depraved perception; and this depravation implies a change in the medium of perception, that is, in the brain and nervous ſyſtem. Now it is well known that madneſs is frequently produced by cauſes purely mental, and in perſons apparently in good health. And as the patient's ſenſibility to very powerful ſtimuli is much diminiſhed in maniacal caſes, they afford another proof of the ſubordination of the nervous energy.

4. Writers of unqueſtionable credit have obſerved, that, in paralytic caſes, motion is frequently deſtroyed, while ſenſe remains†; as

* See the Report of the Commiſſioners.

† Haller. Phyſ. tom. IV. p. 390.

the

the cauſe of palſy almoſt always reſides in the brain, this fact appears equally inexplicable, on the opinion of a diſtinct living principle, or of a nervous energy independent of the brain.

5. When nerves are regenerated, after being cut through, ſenſation and voluntary motion are not always reſtored to the parts beneath the diviſion: the reſtoration was never made in Dr. Monro's experiments*. But on the ſuppoſition of a diſtinct nervous power, the nerve, after its re-union, ought to reſume all its offices.

6. Dr. Whytt aſſerts, that when the ſpinal marrow of a frog is deſtroyed, after decollation, no contraction can be excited in the limbs by cutting or tearing the muſcles†.

While ſo many doubts occur reſpecting the proof of a vital principle, and while the ſuppoſition includes ſo many difficulties, in its own nature, it is allowable to ſuſpend our judgment on the ſubject, till more convincing proofs of its exiſtence ſhall appear, than have as yet been offered to the public.

At preſent, it is evident that we gain nothing by admitting the ſuppoſition, as no diſtinct account is given of the nature or production of this principle, and as an inveſtigation of facts ſeems to lead us back to the brain, as the ſource of ſenſibility and irritability.

* Obſervations, p. 27.

† Obſ. on Irritab. and Senſib. p. 284.

In

In the courſe of this paper, I have uniformly conſidered the action of the mind and brain on the body as identical, without reference to the queſtion of materialiſm, becauſe with reſpect to our facts, and indeed to all medical facts, this notion is ſufficiently complete. I have alſo avoided all diſquiſitions reſpecting the peculiar nature of the nervous energy, convinced, that in the preſent ſtate of our knowledge it is of more conſequence to examine one opinion, which is ſaid to be ſupported by facts, than either to reject or advance many plauſible hypotheſes. I have purpoſely omitted to conſider the application of the doctrine of a vital principle to pathology, as the ſubject would lead to diſquiſitions inadmiſſible by the rules of the Society.

On the COMPARATIVE EXCELLENCE *of the* SCIENCES *and* ARTS; *by Mr.* WILLIAM ROSCOE. *Communicated by Mr.* M. NICHOLSON.

READ MARCH 28, 1787.

THERE is perhaps no circumſtance more injurious both to our improvement and happineſs, than a propenſity to engage, and perſevere, in the ſtudy of particular branches of

 ſcience,

ſcience, without firſt taking that enlarged and general view of our nature and deſtination, by which we ought to aſcertain, and arrange in due ſucceſſion the proper objects of our purſuit. For want of attention to this important ſubject, learning and induſtry have frequently been exerted on unworthy objects; and genius and taſte trifled away, without either affording advantage to mankind, or obtaining reputation to their poſſeſſor.

If, from the time of our entrance on the world, we were enabled fully to exerciſe thoſe powers of mind which are but gradually unfolded, this would be the firſt conſideration which would ſuggeſt itſelf to a rational being; and though thoſe powers are developed only by degrees, yet there is a period in the life of every man, when collecting together thoſe ideas, which have been ſuffered to wander almoſt unreſtrained over the fields of amuſement, it behoves him to conſider with ſerious attention that tablet, which is to contain, in eternal colours, the picture of his future life; and, like a ſkilful artiſt, to obſerve what requires his firſt attention, and what are only ſecondary objects of his regard.

As it is the firſt aim of the painter to produce on his canvas ſome great and ſtriking effect; and by a proper arrangement of parts, to form a beautiful, and conſiſtent whole; ſo it is the buſineſs of every man in the conduct of life, to exhibit to the world a great and conſiſtent character.

ter. In order to accompliſh this end, it is neceſſary to keep one grand object in view, and never ſuffer ourſelves to be drawn from it by too minute an attention to leſs important parts; for though theſe may be in themſelves commendable, yet, if the principal object has been neglected, in order to beſtow more aſſiduity on theſe inferior parts, it betrays a deficiency in judgment and true taſte, which it will be impoſſible any other merit can fully compenſate.

It is however much to be apprehended, that many perſons have paſt through the world, not only without diſcovering, but without once reflecting on the proper objects of their purſuit; and the number is not leſs, perhaps, of thoſe who, having formed clear and determinate ideas of their duty, have in the courſe of their conduct loſt ſight of them; and ſuffered thoſe things which required their immediate exertions totally to ſuperſede the higher ends, to which they ought only to have been auxiliary.

In general life, what is more common than to ſuffer the laudable deſire of acquiring independence to degenerate into an eagerneſs for accumulating riches, without a reference to any further end. But can we avoid pitying the man who employs his time in gilding the frame, when he ſhould be finiſhing the picture?

In the purſuits of ſcience, this error continually occurs; we ſuffer ſome particular ſtudy, which,

perhaps, accident rather than choice firſt ſuggeſted, to claim the continual ſacrifice of our time, and the full exertion of our talents; whilſt ſubjects remain neglected of far more importance, and, perhaps, in fact more ſuited to our tempers and abilities.

The difficulty of diveſting ourſelves of particulars, and looking on things in a general view, will, however, decreaſe in proportion as we habituate ourſelves to ſuch employment; and it is rather for the purpoſe of illuſtrating the propriety of the practice, than with the expectation of facilitating it, that I beg the attention of this reſpectable Society, whilſt I enter more fully into the ſubject.

Man, in his original conſtitution, is endowed with a variety of faculties, different in their ends and nature; but, I conceive, they may be reduced to the three following, viz. the moral ſenſe, or that which diſtinguiſhes virtue and vice; the rational faculty, diſtinguiſhing truth and falſehood; and the ſentimental faculty, or, as it is uſually called, taſte, which diſtinguiſhes beauty from deformity. To the acquiſitions made in improving the rational and moral powers we give the name of Science; whilſt the ſentimental faculty is the foundation of the pleaſures we receive from the ſtudy of the polite arts.

As theſe faculties may be improved by exerciſe, ſo they may be injured, and decay by neglect,

lect, and become totally inapplicable to any good and uſeful purpoſe: and it is therefore the duty of every rational being, to make this improvement the firſt object of his attainment. But in doing this, we ſhould firſt inquire by what means we may beſt anſwer this good end; for as theſe original endowments can only be cultivated by means of the ſciences and arts, and as theſe are much diverſified in themſelves, diſcloſe to us different views, and lead to different ends; it becomes a buſineſs of much importance to inquire what particular branch of ſcience, or of art is moſt deſerving of our attention, before we ſuffer ourſelves to be attracted by ſuch other leſs important, though not uſeleſs, inveſtigations, as may accidentally come acroſs our way.

Now it may certainly be taken for granted, that as beings accountable for our moral conduct, and influencing by that conduct, not only our own happineſs, but, in a great degree, the happineſs of others, thoſe ſtudies which have an immediate reference to the moral duties of life are of the firſt importance.

The ſtudy of the works of nature may next be allowed to engage our attention—a ſtudy, on the knowledge of which depend many of the conveniences and pleaſures of life; and which has, perhaps, a ſtill higher claim to our notice, as inducing us to form to ourſelves proper ideas of the attributes and perfections of the great

Creator; who has opened before us his extenſive volume, and endowed us with abilities to judge of, and taſte to enjoy the beauties it affords.

Science, then, is either moral, or natural; the firſt, immediately connected with the conduct of human life; the ſecond, more remotely ſo through the medium of the works of nature: with reſpect to the former, as it is the indiſpenſable duty of every man to be as fully acquainted with it as his abilities and ſituation will permit, ſo it is diſgraceful and dangerous to neglect it; whilſt the latter, though honourable and uſeful in the acquiſition, may be poſtponed, or omitted, till a proficiency be made in more important ſtudies.

Notwithſtanding this, it has been obſerved of late, and experience ſeems to juſtify the obſervation, that the preſent age is more attached to the ſtudy of natural philoſophy, than to that of morals: which may poſſibly ariſe from an idea, that the latter affords but a ſmall ſcope for the exerciſe of the mind, and conſiſts chiefly of propoſitions either ſelf evident, or capable of a ſimple and decided demonſtration. Admitting for a moment this to be the caſe; yet it by no means precludes the neceſſity of transferring to our own uſe, the reſult of other men's labours; which can only be done by a diligent application to the ſame ſtudies and purſuits. It is not whether the ſcience be known, but whether I know it, about which I ought to be ſolicitous.

It

It will however appear, upon a nearer view, that the ſcience of morals affords a much wider field than may at firſt ſight be imagined. The great variety of circumſtances and combinations which ariſe in a poliſhed and commercial ſtate, open, to an accurate obſerver, a perpetual ſource of ſpeculation. It is, however, my province to ſketch the outline only; to fill it up, properly, would require higher abilities, and more accurate reſearch.

The duties of life are immediately derived from the different relations in which mankind are placed. As a ſimple, exiſting being, detached from any other of his ſpecies, there is a connection between man and his Creator, which ſubjects him to certain duties, prior in point of obligation, to every other claim.

As individuals, connected with other individuals, all entitled to the ſame rights as ourſelves; as members of the particular ſtate from which we derive protection; and from the other ſocial and domeſtic relations of life, many duties are incumbent on us, which require no ſmall degree of accuracy, care and attention, to perform in ſuch a manner, as to merit the approbation of thoſe with whom we are connected, and of our own minds.

Nor let it be thought beneath the dignity of the philoſopher, to examine the laws that ſubſiſt between man and the inferior animals of the

creation; a ſubject, yet, but ſlightly touched on, though, highly deſerving of further inquiry. That acts of injuſtice may be, and too frequently are exerciſed upon them, cannot be doubted; and if ſo, the neceſſity of ſome regulations, in this reſpect, is the immediate conſequence of ſuch conceſſion. A right of property, according to the preſent ſyſtem of things, includes alſo a right to torment, to mutilate, and to kill; to weary out nature by repeated ſufferings; or to deſtroy at once that vital ſpark, the immediate gift of the Divinity, which, when once extinguiſhed, no human power can reſtore: but, it is to be hoped, this may not ariſe ſo much from a ferocity and wanton propenſity to cruelty in the human mind, as from a too prevalent idea, that there are no mutual rights between man and the brute creation; abſolute property being veſted in the one, and unlimited reſignation the lot of the other. To counteract this falſe and injurious opinion, neither moral injunctions, nor political regulations ſhould be wanting; nor can the powers of the mind be more honourably exerted, than in preventing the unneceſſary extenſion of actual pain in the univerſe; or in pleading the cauſe of that claſs of beings, to whom nature, though ſhe gave capacity of pain, denied the power of remonſtrating againſt their ſufferings.

Theſe

Theſe then are of all others the ſtudies

Quæ magis ad nos
Pertinent et neſcire malum eſt.

On the cultivation of theſe depends not only our preſent, but our future welfare; and ſhall we, with the ill-timed application of the pretended philoſopher, perſiſt in the ſolution of a mathematical problem, whilſt the houſe burns around us; or ſuffer ſhells and feathers to attract our notice, whilſt our happineſs and our miſery hang yet in the balance, and it remains in the power of our utmoſt exertion to throw an atom into the ſcale?

Impreſſed with the idea that theſe ſtudies are of the firſt importance to us, and conſcious that we are not uninformed with reſpect to them; it may then be allowed us, to engage in the acquiſition of other branches of ſcience, which unite with the gratification of an innocent and natural paſſion, the expectation of being enabled to render our employment of eſſential ſervice to the happineſs of mankind.

To theſe ſtudies we may give the name of Natural Philoſophy, though, perhaps, in a more general acceptation than that in which it has been, of late, underſtood: but I am not aware of any impropriety in the uſe of this term, applied to the ſtudy of the whole ſyſtem of nature; as well intellectual as material. The faculties of

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the human mind are as much a part of that ſyſtem, as the form of our bodies, and ſeem therefore equally to be included under the ſtudy of natural philoſophy.

In purſuing the ſubject, it will, however, be neceſſary to advert to the different channels, into which this great branch of ſcience is divided. Theſe are, firſt, the knowledge of intellect, called metaphyſics; ſecondly, the knowledge of the extent and quantity of ſubſtances, called mathematics; and thirdly, the knowledge of particular properties of ſubſtances, uſually called phyſics.

"The mind of man," ſays a late excellent writer, "is the nobleſt work of God which na-"ture diſcovers to us, and therefore on account "of its dignity deſerves our ſtudy." That this is the primary, and moſt important branch of natural philoſophy, muſt be evident to any one who conſiders that, before we apply ourſelves to acquire extraneous knowledge, we ought to aſcertain what particular kind our faculties are adapted to attain; and having ſeen what is, and what is not, in our power, we may then be enabled to purſue ſuch ſubjects as are within our reach; and not imprudently laviſh our time on thoſe which come not within the ſcope of the faculties with which we are endowed.

The ſcience of mathematics is converſant with the extent, and quantity of ſubſtances; and teaches the unchangeable and univerſal properties

perties of viſible objects. It therefore precedes the ſtudy of phyſics, whoſe province it is to inquire into the particular nature and laws of ſuch objects. If the pleaſures received from ſcientific purſuits depend on the inveſtigation and acquiſition of truth, the ſtudy of the mathematics is of all others the moſt capable of affording enjoyment; its concluſions not depending on the ſubtilty of argument, or the fallacy of language, but being capable either of ſenſible demonſtration, or immediately referring to the firſt principles of human reaſon. It may alſo be added, that this ſcience ſeems more complete and perfect than any other, as it generally attains the full end it aims at; whereas, in all other ſciences we expect to improve, rather than to perfect knowledge.

Under the comprehenſive denomination of phyſics are included many particular ſtudies, each of which affords ample materials for inveſtigation. The profeſſed ſubject of its inquiry is the whole ſyſtem of material nature: in the purſuit of which branch of learning it ſeems proper, in the firſt place to acquire a general knowledge of the univerſe, as far as it is diſcoverable either by our natural endowments, or the artificial aſſiſtance with which human invention has ſupplied us; and from thence to proceed, in our inquiries, through the animal, vegetable, and mineral kingdoms; which employment, as it includes all

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we know of the earth we inhabit, has acquired the name of natural hiſtory.

It is by no means my intention to enter into a detail of the ſeveral ſtudies which properly arrange themſelves under theſe different heads: it is ſufficient to have indicated the pre-eminence and ſubordination which ſeem to ſubſiſt between the different objects of ſcience, and to have ſhewn the neceſſity of adopting ſimilar diſtinctions.

It muſt however be remarked, that it is not perhaps in our power to purſue the ſciences in the preciſe order here pointed out; for there is a connection throughout the whole ſyſtem of human knowledge, which renders it impoſſible to arrive at excellence in any one branch, whilſt we remain totally ignorant of the reſt. The tendency of natural philoſophy to promote the intereſts of morality, has already been hinted at; and the ſcience of mathematics is in like manner intimately connected with other branches of natural philoſophy.

I muſt alſo remark, that though under the general heads before mentioned, I mean to comprehend all human ſcience; yet they by no means include every literary attainment, in the purſuit of which mankind are buſied; many of which are acquired only for the purpoſe of being again employed in the attainment of further knowledge. But, as a ſkilful artificer before he commences an important work, will beſtow great attention

attention in providing the implements neceſſary for his purpoſe; ſo it will behove us to be diligent in attaining theſe preliminary endowments, without which our labours may either be partially fruſtrated, or may entirely fail of ſucceſs.

Of real knowledge there are two ſources, ſolitary obſervation or inquiry; and information derived from the previous knowledge of others; which laſt is by far the moſt copious of the two; but as this can only be communicated by the aid of language, either oral or written, ſo the certainty of the ideas we thus acquire, will depend on the ſkill we have attained in that language, by means of which the information is conveyed.

Thus the acquiſition of different languages becomes neceſſary; but in this, as in other inſtances, care muſt be taken that we miſtake not the means for the end; and whilſt we are employed in preparing further materials, ſuffer not ſo much of the building as we have already erected to fall to decay. To exert ourſelves in attaining a knowledge of language, for the purpoſe of employing that knowledge in higher purſuits, is truly laudable; but to be converſant only with words, and ſuffer the ſcience to center in itſelf, is abſurd and improvident.

It is unneceſſary to enter into an inquiry, how far tranſlations may ſupply the deficiencies of claſſical learning; or to point out the many advantages of which ſuch learning is productive;

this

this having been already done, by an author* to whom the public are under many important obligations. On the result of his "Inquiry into the usefulness of Classical Learning," I shall take it for granted, that a knowledge of the ancient languages is of great advantage in many departments of science; from the exercise of the mind in the abstruser parts of grammatical study, it acquires a facility, and accuracy of distinction which no other occupation can bestow; and by a proper selection of authors we may advance our real knowledge in any particular science, whilst we are procuring the means of applying ourselves with advantage to further studies.

If language be considered as an implement for the purpose of attaining, or improving knowledge, logic is that art which teaches us how to make a right use of such implement; whilst philology, or the science of criticism, maintains the purity of language, and guards it against those innovations which inattention fashion and habit, are too apt to introduce.

These studies, if they come not properly under the denomination of science, are essential to the due prosecution of it. Whilst they support their dignity, we may rest satisfied that true knowledge maintains its ground; but when these begin to be neglected, there is the greatest reason

* Beattie.

to

to believe that ignorance and barbariſm are again aiming to eſtabliſh their ancient empire, and to fear that their endeavours are not without ſucceſs.

It has been before obſerved, that the pleaſures we receive from the fine arts depend on an original or inſtinctive power of the mind, which I have choſen to call the ſentimental faculty: meaning to infer, that, as the improvements we make in virtue and knowledge, are founded on the moral and rational powers, ſo the acquiſitions we make in the arts, conſiſt in the improvement of certain feelings intimately connected by ſome ſecret and inexplicable union with the effects of thoſe arts.

Whether the improvement of this faculty be, like that of our other endowments, a duty incumbent on us; and if ſo, whether that duty ought to have a preference to any, and which, of thoſe particular occupations we have before noticed; and again, which of thoſe arts, employed in the cultivation of our feelings, is moſt powerful and efficacious in that reſpect, and ought more particularly to claim our regard, are queſtions which might admit of long inquiry, but which I ſhall touch upon as briefly as poſſible.

The arts now alluded to, are thoſe of poetry, muſic, and painting, or as they are called, in diſtinction from manual ingenuity, the polite arts.

Althongh

Although theſe arts ſeem on the firſt view to be contributary only to our gratification; yet it ſhould ſeem that Providence, in endowing us with propenſities and abilities to inveſtigate and improve them, meant that they ſhould become, in ſome degree, the objects of our inquiry: and indeed we ſee throughout the whole creation, that the ends of beauty, amuſement, and pleaſure have never been neglected; otherwiſe we might aſk, in the language of Shenſtone,

"Why knows the nightingale to ſing?
"Why flows the pine's nectareous juice?
"Why ſhines with paint, the linnet's wing?
"For ſuſtenance alone? For uſe?
"For preſervation? Every ſphere
"Shall bid fair pleaſure's rightful claim appear.
"And ſure there ſeem of human kind,
"Some born to ſhun the ſolemn ſtrife;
"Some for amuſive taſks deſign'd
"To ſooth the certain ills of life,
"Grace its lone paths with many a bluſhing roſe,
"New founts of bliſs diſcloſe,
"Call forth refreſhing ſhades, and decorate repoſe."

The cultivation of the polite arts ſeems then to be conducive to the happineſs of man, and conſiſtent with the trúe end of his nature: but there is a ſtill higher purpoſe to which they ſhould be applied, the conſideration of which will tend to aſcertain the rank they ought to hold, and to determine their relative claims upon our time and abilities.

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In admitting that the arts are intended for our gratification, it muſt not be underſtood that utility is excluſively the end of ſcience, and amuſement the end of the arts. From the ſtudy of the ſciences, the underſtanding is enlarged, and the faculties ſtrengthened; from that of the arts, the affections are exerciſed and the heart is improved.

It would be ſuperfluous, before the preſent audience, to enter into an explanation of this ſentiment; for who has not experienced that delightful glow, that inexpreſſible ſenſation, favourable to virtue and humanity, which the labours of the genuine poet never fail to inſpire? Who has not felt himſelf rouſed to action, or excited to pity, or affected with ſocial ſorrow, by the powerful effects of harmony, or the vivid repreſentations of the pencil? After being converſant with theſe arts, the mind feels itſelf ſoothed and ſoftened, and is then capable of receiving more diſtinctly and deeply, and retaining to more effectual purpoſe, thoſe finer impreſſions, whence a very conſiderable ſhare of human happineſs is derived, and which either give riſe to, or highly improve, all the charities of ſocial life.

Let us not then conclude, that, becauſe the fine arts are apparently calculated for the gratification of our feelings, therefore they are to be poſtponed to all the more ſerious avocations which have before been noticed. It is their pro-

vince to act upon our affections and paſſions, the impulſes of which have often as principal a ſhare in the direction of our conduct, as the ſuggeſtions of our judgment; and to regulate, correct, and harmonize them, by thoſe means which Providence has afforded us, becomes therefore a part of our duty no leſs eſſential, than the improvement of many of the ſciences, or the cultivation of our rational powers.

To aſcertain the particular rank to which the arts are entitled, might perhaps be a matter of ſome difficulty. That they ought by no means to interfere with the attainment of moral ſcience is certain; and perhaps ſeveral branches of natural philoſophy, cloſely connected with the utility of mankind, may have a ſtronger claim on our time and abilities; but that they are invariably to be poſtponed to the ſtudy of nature, in all its branches cannot be allowed. From the contemplation of heroic actions, whether communicated by the pen or the pencil, feelings are incited, ſtrongly connected with the firſt and leading object of our purſuit, and of great importance to the advancement of virtue and the improvement of human life.

I muſt alſo remark, that as an unvaried application to one purſuit, is not only irkſome to us, but frequently defeats the end it aims at, thoſe occupations, by whoſe aſſiſtance the mind can relax without debilitating, and amuſe without

out degrading itſelf, muſt ever ſtand high in our eſtimation; and by being intermingled with our more ſerious labours, will afford a degree of cheerfulneſs, vigour, and activity which will tend more than any other means to inſure ſucceſs in higher purſuits.

Of an endeavour to fix the comparative excellence of the polite arts with each other, the reſult would be of little uſe, nor is the ſubject ſuſceptible of novelty. There is no great difficulty in influencing the judgment to the purſuit of any particular ſtudy; but the ſentimental faculty chooſes its own objects, and ſeldom makes a proficiency in any branch of art which it has not ſpontaneouſly adopted.

I have thus made a faint attempt to elucidate an idea, which I conceived to be of conſiderable importance; and though I pretend not to have balanced with an accurate hand the comparative merit of the ſciences, it is enough for my purpoſe, if I induce others to reflect, that there is a very conſiderable difference in the degree of attention that ought to be paid to them. And it will, I hope, ſufficiently appear, that the cultivation of the moral ſenſe ought to be the grand object of our endeavours, and that even the improvement of our intellect is laudable, principally, as it promotes this great end.

Let it however be permitted me to remark, that throughout this eſſay, I have conſidered

every individual of mankind as engaged to improve his abilities, and thereby promote his own happineſs to the utmoſt of his power: but that I by no means would be thought to detract from the characters of thoſe men, who have employed their time and talents in the purſuit of particular ſciences, even to the excluſion of others; and by arriving at eminence in them, have extended the bounds of human knowledge, and ſmoothed the way for future travellers. Infinite are the obligations mankind are under to the illuſtrious characters who have thus devoted themſelves to the public good: but we may reaſonably expect to ſtand excuſed, if, whilſt we enjoy the fruits of ſuch generous ardour, we aim at the ſecurity of our private happineſs, and prefer the ſecret conſciouſneſs of a proper diſcharge of the duties of life, to the popular approbation, which deſervedly waits upon thoſe who have ſucceſsfully exerted their abilities, on ſubjects which have little or no connection with the promotion of virtue, and the advancement of moral rectitude.

On the CRETINS *of the* VALLAIS; *by Sir* RICHARD CLAYTON, *Bart.*

READ MAY 9, 1787.

MANKIND has been divided by Linnæus into four ſeparate claſſes, to each of which he has aſſigned ſome characteriſtic difference in point of diſpoſition. The European and American, the African and Aſiatic receive, regularly, it ſhould ſeem according to his ſyſtem, an impreſſion from the climate, which adheres to them through life, unleſs it have been weakened or overpowered by their having left their native country in very early infancy*. Other naturaliſts have remarked a like degree of its influence in the formation and diſpoſition of animals in general, and its empire has been extended by ſome, even to the vegetable world†. The obſervation is indeed an old one. Hippocrates has a long chapter‡ in which he treats of the air, water, and particular ſituations, and

* Buffon. Hiſt. Naturelle. De Generation des Animaux.

† Wilſon on the Influence of Climate on Vegetable and Animal Bodies.

‡ Sect. III. p. 280. Editio Foeſii.

he there traces their ſuppoſed effects on the ſtructure and paſſions of mankind. Though venerable from its age, the opinion has been lately controverted, and ridicule has been called in to attack thoſe poſitions, againſt which more ſolid reaſon appeared to have exhauſted all her powers. But, whatever may be the doubts of modern ſceptics, or the problems of new philoſophers, no arguments can be brought up againſt viſible demonſtration. To thoſe who deny the effects of local cauſes, and the influence of particular climates and ſituations, may be oppoſed only the Cretins of the Pays de Vallais; a ſet of beings, above indeed the brute ſpecies, but in every reſpect below their own. Without a previous acquaintance with their real origin, the ſtranger might be tempted to conſider them as a diſtinct, inferior part of the creation, and the intermediate link betwixt man, and his disfigured image, the Ouran-Outang. The deſcription Linnæus has given us of this animal may be applied to the Cretin, with a few exceptions; and that of the French Pliny, as the Comte de Buffon has been called, is marked with a reſemblance ſtill more ſtriking. The diſtrict theſe beings are compriſed in, is part of the lower Vallais, and takes in about thirty miles in length, and eight in breadth. Round Sion they are very numerous, but they are moſt ſo between the bridges of St. Maurice and Rîde.

A few

A few of them are to be found on each ſide, and at each extremity, but they then gradually diſappear. Caſt in the ſame mould with the reſt of mankind, they have, moſt certainly, its form; but one looks in vain for

"The human face divine,"

illumined with ſenſibility, and lighted up with the ray of underſtanding. Phyſiognomiſts have pretended to diſcover a trait of the inward character, written on almoſt every countenance, that beſpeaks the paſſions each individual is warmed with. One proof may at leaſt be added to their ſyſtem, without adopting it in its fulleſt extent; for, with the Cretin, the vacuum is diſtinctly viſible. Every mental faculty appears benumbed, and the dreadful torpor is unequivocally expreſſed. It muſt be admitted, however, that there are diſtinctions in the ſcale of ſenſe, and different gradations amongſt them, from total darkneſs to intellectual twilight, and the dim dawn of underſtanding. Some have a ſort of voice, but the deaf and dumb are very numerous; and there are multitudes who are even mere animal machines, and devoid of almoſt every ſenſation. In point of ſtature, four feet and a half is the ſtandard they reach in general, and it is ſeldom exceeded more than a few inches. Their countenances are pale, wan, and livid; and, excluſive of other external marks of

imbecility, they have the mouth very wide, and the tongue and lips uncommonly thick and large. Nature ſeems alſo to have exhauſted with them all her efforts at a very early hour, and old age treads upon the heels of infancy. They die, regularly, young, and there are not any inſtances of their arriving at the advanced period of human life. The propagation of the ſpecies is the only appetite numbers of them are ever rouſed by, and it rages with more than common violence. The ſame laſciviouſneſs is ſuppoſed to apply to the monkey and baboon. With ſome, poſſibly, the obſervation may create a ſmile, but the naturaliſt will pauſe on the analogy, whilſt it will not eſcape the moraliſt, that as man becomes the ſlave of his own unruly paſſions, he deſcends into a proximity to the brute creation. In this deſcription of the Cretin, it ought to be obſerved, thoſe only in the fulleſt ſenſe of the word are to be included. In the different gradations, nature has been uniformly regular. Where ſhe has leaſt varied from herſelf, the Cretin moſt reſembles mankind in a ſtate of perfection, both in countenance and figure, reaches nearer its general ſtature, and there is leſs difference in their reſpective periods of exiſtence. The repeated view of ſuch multitudes of unfortunate beings is, to the laſt degree, piteous and affecting. There is, notwithſtanding, ſome conſolation in reflecting, that they are not themſelves

themſelves ſenſible of their misfortune, and that every care is taken of them, which their ſituation will admit of.

In ſome places they are looked on as the idiots of Turkey: in others they are conſidered as predeſtinated beings, the devoted victims of the wrath of Providence, and puniſhed by its viſitation for the ſins of the reſt of the family. Either idea inſures them kindneſs and attention. In the firſt inſtance, they are objects of religious veneration; in the ſecond, they are recompenſed out of gratitude, on account of their ſuppoſed ſufferings for the frailties of their parents, and their friends.

To conſider ſuch groups of them as accidental, is impoſſible. There have been generations after generations of them, and though their numbers vary in different families, ſome are almoſt entirely compoſed of them. Nature muſt here therefore act on certain principles, and be governed by fixed laws, though the former are not yet known, and the latter have not been diſcovered. What proves, to a degree almoſt of mathematical certitude, that there is ſome phyſical reaſon for the dreadful ſingularity, is the ſingle circumſtance, that a family coming from a diſtance to reſide within the diſtrict, has, in a few years, occaſion to lament, on its increaſe, that idiocy it was before a ſtranger to. The ſame argument has equal force againſt its being tranſmitted from inter-

inter-marriages with families whoſe anceſtors had unfortunately a ſhare in the calamity. The reverſe of the propoſition, I have been lately informed from very reſpectable authority, holds equally true; and that Cretin colonies removing from the diſtrict, and marrying only amongſt themſelves, after one generation, or at moſt two, loſe the diſguſtful diſtinction they carried with them. Long as the ſubject of this paper has exiſted, it is aſtoniſhing nothing has been ſyſtematically written on it. A memoir was indeed read, ſome years ago, to the Royal Society at Lyons, but as I do not find it was ever publiſhed, the members only became acquainted with the opinions, its author, the Comte de Maugiron, entertained. Government has at laſt begun to intereſt itſelf, and has recommended ſome precautions to be taken, by which, it is hoped, the number of the Cretins will diminiſh. Many of the moſt deplorable are now ſecluded from ſociety, and maintained with great care in the hoſpital at Sion; and their marriages with each other, which were formerly permitted in order to prevent other inconveniences, and by which they were propagated *ad infinitum*, are not at preſent allowed of. The early management of the children is alſo particularly attended to, and minutely watched; and on the leaſt ſuſpicion of a tendency towards Cretinage, they are ſent into the diſtant mountains to be nurſed. Whether any of theſe precautions,

precautions, or all of them united, will be followed with the conſequences devoutly to be wiſhed, time, the great touch-ſtone of all experiments, can alone decide.

In the ſeveral deſcriptions of Switzerland and the Vallais, the ſubject has been ſometimes caſually glanced at. Some brittle, hazardous ideas have been thrown out at random, but in general, it has been left in the ſtate in which it has been found, and the circumſtance has been barely mentioned, without any endeavours to point out its origin and cauſe. I have no claim to any greater ſhare of wiſdom, and do not pretend, by any means, to ſuperior ſagacity or penetration.

I lay little ſtreſs on the influence of the imagination of the mother on the fœtus, which has been the theory of ſome. Without entering into the queſtion, how, or in what manner, ſuch an impreſſion is communicated, I ſhall obſerve only, it is an opinion which appears to be giving way daily; and that even its warmeſt partiſans admit only of its exiſtence in very few inſtances, and under very limited reſtrictions. The Cretins are too numerous to allow of ſuch a partial cauſe; and as what is perpetually before the eye ſoon ceaſes to be matter either of aſtoniſhment or terror, their very numbers would counteract any effect they might otherwiſe occaſion. Their country women, born and bred up amongſt them, conſider them only as every other production

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of their country, and in fact, instead of bestowing on them particular notice or regard, they are surprised when a stranger examines them with any scrupulous attention. I should imagine, therefore, we ought to search for some other cause. Of the writers who have touched on the Cretin, some have attributed the misfortune to the supposed cause of the goitres, so very common in many of the Swiss peasants, the water they drink being impregnated with snow, tufa, and some mineral substances washed down with it from the neighbouring mountains. That the Cretins are subject to the goitre, must be acknowledged; but it should at the same time be remarked, as it is common to the rest of the inhabitants, its cause, whatever it may be, can hardly be supposed to be that of Cretinage. The peasants of the Alps, of Tirol, and many other parts of Switzerland drink water of nearly the same quality, and have the goitre; but the Cretins are confined to the district I have mentioned, and if they occur in other places, it is merely from a removal with their parents. This hypothesis appears therefore to have been taken up, likewise, without solid foundation, and the fabric raised upon it has been built on a scale too narrow and confined. The air has been, by others, supposed to be the sole cause of the disaster. Throughout the whole country they are found in, it is most certainly unwholesome. They reside,

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in fact, in a sort of vast Basin, full of excessive exhalations from the Rhone, and the marshes on its sides; and the reflection of the sun from the surrounding mountains, which are almost vertical, forms an atmosphere very singular for its humidity and heat.

At Sion in particular, the houses are often steeped up to the second story, in a thick, hot, and glutinous vapour; and the body, during the summer months, is in a very uncommon state of perpetual perspiration. This naturally occasions a lassitude and indolence, which unstring the human frame; and along with them, one meets with their usual attendants, excessive poverty and filth. Their joint effects on the human body, it would be useless to dispute; but how they can curtail the stature, and coagulate the understanding, to such a wonderful degree, is difficult to ascertain. Whether any light may be derived from the dissection of a Cretin, is an experiment that has not yet been made. To be of any use, however, it should not be confined to a single subject, but should be extended to every variety, from the moment the malady has made its first appearance, to the time it has arrived at its full maturity of weakness. Some attempts for this purpose I understood had failed, and they will be yet attended with difficulty, and some little danger. Philip of Macedon's golden key will not here unlock the grave;

grave; and a violation of the rights of ſepulture would be ſtill conſidered as the firſt of crimes.

Little can be gleaned up, I am apprehenſive, from the hiſtory of the human ſpecies, relative to the queſtion; but amidſt its varieties, we find the Dondos, or African white negroes; the Kakerlaks, or Chacrelas of Aſia; and the Blafard, or White Indian of the Iſthmus of Darien; all of whom have ſome peculiarities correſponding with thoſe by which the Cretin is diſtinguiſhed. The Dondos are moſt common at Congo, Loango, and Angola, and the Kakerlaks, or Chacrelas, in the Java iſlands; but as they are not very numerous, they have been conſidered as a Luſus Naturæ, and her accidental productions*. Of the white Indians of Darien little was known in Europe before 1680, though Cortez† had given a long and minute deſcription

* It is remarkable, however, this Luſus Naturæ in the Java iſlands has been extended even to the monkey. The governor of Batavia had one or two white ones in 1785, brought from thoſe iſlands, though they are in all that part of the world univerſally black or brown. Mynheer Butterkoper, and Mynheer Meſſa the Water-Fiſcal, ſhewed them to a friend of mine. The face was of a milky white, the eyes red, and they were between two and three feet high.

† Las Cartas de Don. Hernando Cortez de la Conquiſta de Mexico al Emperador. They have been tranſlated into Latin, and are in the collection of Hervagius, under

tion of them in his letters to Charles V. The ſtature of the Dondos, the Kakerlak, and White Indian is nearly that of the Cretin of the Pays de Vallais, and their whole apppearance announces exceſſive debility and weakneſs. Their ſimilitude, in many other reſpects, ſeems to give ſome weight to the ſuppoſition of a like deficiency in their formation. The weakneſs of the eye, they are all in ſome degree ſubject to; deafneſs in one degree or other is peculiar to them; they all die early; and they have all the ſame ſcanty portion of intelligence.

Much has been written* on the blackneſs of the negro, and for ſome time, like the atoms of Epicurus, one ſyſtem regularly confuted another. Whatever the derangement which produces the variety in the negro may be owing to, it may poſſibly bear ſome relation to that which occaſions an alteration, nearly as violent, in the human ſpecies of the Vallais. Mr. Michel, a

der the title F. Corteſii de Inſulis nuper repertis Narratio ad Carolum Quintum. For an account of the white Indian ſee Buffon, Hiſt. Naturelle de l'Homme. Dampier's Voyages, vol. IV. p. 252, and Melange de Literature, tom. I. where Voltaire has given a very minute deſcription of the white Indian brought to Paris in 1744.

* See Sanctorinus, Malpighi, Albinus, Ruyſch, Haller, Winſlow and Heiſter. Town's Letter to the Royal Society. Hiſt. de l'Academie de Sciences. 1702. Diſſertation de Monſ. Barrere. Traitè de Monſ. le Cat. Zimmerman Geograph. Zoolog. & Memoires de l'Academie de Berlin.

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name of ſome eminence at Berlin, for anatomical inquiries, has remarked in one of his letters, " Vous obſervez la * couleur de ſperme eſt diffe- " rente de celui des Hommes blancs. Vous at- " tribuez, au Changement de ce ſperme, leur me- " tamorphoſe de noir en blanc ; ſi l' on ajoute á " cela, la couleur differente de leur Cerveau, de " leur Sang, et de la liqueur qui forme leur Epi- " derme, on verra que l' effet qui blanchit les " Negres eſt fondé dans un changement des hu- " meurs les plus eſſentielles de corps."

Taking the poſition for granted, how this eſſential alteration has been brought about will be ſtill matter for phyſical diſcuſſion. Air, water, aliment, indolence and filth may be powerful cauſes, and they become undoudtedly more forcible when combined, and when they have acquired increaſed ſtrength from their continued operation for a long courſe of years, on ſucceſſive generations. The air is moſt avowedly inſalubrious on the whole iſthmus of Darien, and what appears deciſive, as to its influence, is the known fact, that the female negroes brought from

* If this be an error, it is an error at leaſt of long duration. Herodotus has advanced boldly : η γονη δε αυτων την απιενται εις τας γυναικας ε καταπερ των αλλων ανθρωπων εστι λευκη, αλλα μελαινα καταπερ το χρωμα· τοι αυτην δε και Αιθιοπες απιενται θερην· Thalia. 240. Ed. Weſſel. It is but fair however to add that Ariſtotle denies this expreſsly. Hiſt. Animal. lib. III. C. 27. περι σπερματος ; and alſo Gener. Animal. lib. II. C. 2. περι της τε σπερματος φυσεως.

Africa

Africa to Carthagena and Panama, where the climate is to the laſt degree inhoſpitable, and the perſpiration of the body aſtoniſhing, produce more of the white Indians than in any other part of the new continent.

The ſame cauſes regularly ſubſiſting, it may be aſked why they are not attended uniformly with the ſame effects. To reſolve the difficulty, may it not be queſtioned, whether the humours of certain perſons are not in ſome ſecret, unknown ſtate, which facilitates the metamorphoſis.

To thoſe whoſe ſtudies lead them to inveſtigate the human frame, with its diſorders, the ſubject is not altogether an unintereſting one. We owe much to the labours of great and learned men during the laſt century; but, notwithſtanding the rapid advances they have made in every part of ſcience, much remains to be yet done. A wide field is ſtill open for reſearches into human nature, and poſterity may, perhaps, diſcover what we have in vain attempted to explore.

A Description *of the* Eye *of the* Seal; *by Mr.* Hey, *of* Leeds.

read october 26, 1787.

In the debate concerning the immediate organ of vision, it has been asserted, and is taken for granted by the best authors, that the eyes of the seal and porcupine are differently formed from those of other animals; having the optic nerve inserted in the axis of the pupil. This difference of structure has been urged as an argument to prove, that the retina is that part of the eye which receives the picture, and conveys to us the idea of external objects. For since, according to the laws of optics, the picture must be formed in and about the axis of the pupil; and since the choroides is wanting at the insertion of the optic nerve, the choroid coat cannot, in these animals, receive the complete picture of any object.

Though the argument fails with respect to the animal whose eye I am about to describe, yet I do not mean to express any doubt that the retina is the proper organ of vision. The preceding observation is mentioned as that which excited my curiosity to know, whether this de-

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viation from the ordinary course of nature was a matter of fact. I procured two eyes of a seal, caught in the north seas, and which were preserved for my use in rum; and examined them both by dissection. The following short account of the peculiarities in the eye of this animal, may not be unacceptable to the Literary and Philosophical Society.

The form of the eye, when deprived of the adipose membrane and muscles (in which state I received it) was quite globular, measuring three inches and three quarters in circumference.

The sclerotis was rather thinner than that of a sheep; but diminished gradually, as is usual, from the posterior part of the eye, to its junction with the ciliary ligament. From the great breadth of the ciliary ligament, which measured a quarter of an inch, the thinnest part of the sclerotis was not contiguous to the cornea, as in the human and sheep's eye, but surrounded the middle of the eye. So that the outer membrane, or coat, grew first gradually thinner, to the middle of the eye, and then became suddenly thick, continuing so to its junction with the cornea.

The cornea was horizontally oblong, the vertical diameter being about ·75 of an inch, while the horizontal was ·85; so that the horizontal diameter exceeded the vertical by one-tenth of an inch.

The choroid coat adhered very firmly to the sclerotis. It was black on its posterior surface, but grey on its anterior.

The iris was black on both its surfaces, and was evidently a continuation of the choroides. The pupil was remarkably small, forming an aperture no larger than might be made by the puncture of a middle-sized pin. The figure of the pupil, before the iris had been touched, was that of an equilateral triangle.

The crystalline humour was nearly spherical; if there were any deviation from a sphere, it was by approaching to the figure of an oblate spheroid. The ciliary processes were attached to the equatorial part of the crystalline humour, if I may be allowed the expression.

At first sight, the optic nerve seemed to be inserted in the axis of the pupil; but, upon making a longitudinal incision through the nerve, quite down to the retina, I found that its insertion was on the inner side of that axis, as in other animals. The substance which surrounded the optic nerve was fibrous, and, spreading itself out every way as it approached the sclerotis, was continued into the substance of that coat. Indeed, the sclerotis seemed to be formed by the fibrous substance which accompanied the optic nerve; only, after this substance had diverged a little way from the nerve, it became compact, as the sclerotic coat usually is. The optic nerve was somewhat

somewhat enlarged as it passed through the sclerotis, and was again contracted in its passage through the choroides. In the former part, the diameter of the nerve was ·08 of an inch; in the latter ·06.

Upon measuring carefully the different arcs of of the circumference of the eye, taken from the optic nerve to the center of the pupil, it was found that the nerve was placed at the distance of ·11 of an inch from the axis of the pupil. And as the axis of the pupil must be in the center of that area on which the picture is formed, the diameter of the area on which a picture may be formed in the eye of a seal is ·22, or nearly a quarter of an inch, of the retina, excluding the breadth of the optic nerve.

The quantity of fibrous substance accompanying the optic nerve in this animal, the spreading out of that substance, with the smallness of the nerve itself, seem to have been the causes of that deception, which some incautious naturalist has fallen into, and which has been propagated by the different authors who have copied one another on this subject.

The smallness of the pupil in this animal is very remarkable. What there is in the habits of a seal to require this structure, I cannot tell. It seems a general law of nature, that the pupil of the eye becomes dilated at death. But unless this law be reversed with respect to the seal, its

eye muſt admit very little light, though it may allow great diſtinctneſs of viſion.

In meaſuring different parts of the eye, I was aſſiſted by Mr. Aſpdin, an ingenious watch-maker, in this town.

Observations *on the* Knowledge *of the* Ancients *reſpecting* Electricity; *by* William Falconer, M. D. F. R. S. *Communicated by Dr.* Percival.

read may 2, 1788.

It is, I believe, generally allowed, that Electricity, conſidered as a principle, or quality, pervading all nature, was unknown to the philoſophers of antiquity. It is, however, admitted, that ſome of its effects were obſerved by them, but their obſervations led them to believe, that it was a peculiar property of certain bodies only, and not that it was, as it now appears to be, one of the moſt general and active agents in the natural ſyſtem. Theophraſtus is, as far as I know, the firſt writer that has remarked the attractive power of bodies to one another, diſtinct from the attractions of gravity and magnetiſm.

netiſm*. He ſpeaks in his Treatiſe on Stones, of "amber dug on the coaſt of Liguria, which had "an attractive power. He intimates, that the "cleareſt had this property in the higheſt de-"gree, and that it would attract iron." The ſame writer aſcribes ſimilar properties to the lapis lyncurius, which is now believed to be the tourmalin, though it was formerly eſteemed to be the ſame with amber. Theophraſtus, however, clearly diſtinguiſhes them from one another, though he aſcribes the ſame attractive properties to both. "It poſſeſſes†," he ſays, "an attractive power like amber; and, as they "ſay, attracts not only ſtraws, and leaves, but "copper alſo, and iron, if in ſmall particles."

Pliny gives a ſimilar account. "Amber‡," ſays he, "being rubbed with the fingers, and

* και γαρ ορυκτον περι λιγυστικην. Και τουτο αν ἡ του ελκειν δυναμις ακολουθοιη μαλιστα δε επιδαλος· και φανερωτατη η τον σιδηρον αγουσα. Theophraſt. περι λιθων.

The contrary is now thought to be the caſe, as the cloudy amber is thought to be the moſt ſtrongly electric *per ſe*. See Dr. Milner on Electricity.

† Ελκει ωσπερ το ηλεκτρον. Οι δε φασιν ε μονον καρφην, και φυλλα, αλλα και χαλκον, και σιδηρον, εαν η λεπτος. Ibidem Theophraſti.

‡ Cæterum attritu digitorum acceptâ, vi caloris attrahunt in ſe paleas & folia arida, ut magnes lapis ferrum. Plin. lib. XXXVII. cap. 3.

Nec folia autem aut ſtramenta in ſe rapere, ſed æris aut ferri laminas. Ibidem Plinii.

" having thereby become warmed, attracts to " itſelf ſtraws and dried leaves, in the ſame man- " ner as the magnet does iron." He aſcribes the ſame properties to the lapis lyncurius. Solinus*, Priſcian†, and, I believe, many other writers have noticed the ſame quality of that ſtone.

But the attractive power which electricity imparts to bodies, is not the only property of that fluid that was known to the ancients. They were acquainted with the effects of the electric ſhock; and have minutely deſcribed the ſenſations occaſioned thereby, upon the human body. I do not however mean to inſinuate, that they apprehended any connection to ſubſiſt between the attractive power juſt ſpoken of, and that which I am about to mention. It is now proved, beyond a doubt, that the benumbing power, which is found in the torpedo, and ſeveral other fiſhes, is,

* Lapidi iſti ad ſuccinum color eſt pariter ſpiritu attrahit propinquantia. Solin. cap. II.

† Paleas rapiunt tractu frondeſque caducas. Priſc. in Periegeſi.

In Syria quoque foeminas verticillos inde facere & vocare harpaga, quia folia & paleas veſtiumque fimbreas ad ſe rapiat. Plin. XXXVII. 3.

The word by which amber was known among the Arabs (karabe) is ſaid by Avicenna to be of Perſian origin, and to ſignify its power of attracting ſtraws. Salm. De homonym. hyles Iatricæ.

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in reality, produced by the electric ſtroke, which they have a power of imparting to any object they pleaſe, with which they come in contact; and is indeed the method they have both of defending themſelves, and providing food. Ariſtotle ſays, that the torpedo* "cauſes, or "produces a torpidity upon thoſe fiſhes it is "about to ſeize, and having by that means got "them into its mouth, feeds upon them." He adds, "that this fiſh hides itſelf in the ſand and "mud, and catches thoſe fiſh that ſwim over it, "by benumbing them; of which," he ſays, "ſome have been eye-witneſſes. The ſame fiſh "has alſo the power of benumbing men." Pliny ſays, "that this fiſh† has the power of "communicating its benumbing quality, if "touched with a ſpear, or a rod; and is able to "impart a torpor over the ſtrongeſt muſcles of "the body; and, as it were, binds and ſtops the "feet even of the ſwifteſt perſons." Galen‡

* η τε ναρκη ναρκαν ποιουσα ων αν κρατησειν μελλη ιχθυων, τω τροπω ον εχει εν τω σωματι λαμβανουσα, τρεφεται τουτοις. καταπρυπτεται δε εις την αμμον και πηλον· λαμβανει τε τα επινεοντα οσα αν ναρκηση επιφερομενα τῶν ιχθυων· και τουτου αυτοπται γεγενηνται τινες. —— η τε ναρκη φανερα εστι, και τοις ανθρωποις ποιουσα ναρκαν. Ariſt. Hiſt. Anim. L. IX. 37.

† Torpedo etiam procul & e longinquo, vel ſi haſtâ virgâve attingatur, quamvis prævalidos lacertos torpeſcere facit, & pedes quamlibet ad curſus veloces & alligat & retinet. Plin. XXXII. 1.

‡ Galen de locis affect.

ſays,

ſays, " that the torpedo is endued with ſuch a " a power, that if it be touched by the fiſherman " with his eel ſpear, it inſtantly ſtupifies the " hand, tranſmitting this power through the " ſpear, to the hand." Plutarch* ſays, " that " it affects the fiſhermen through the drag-net; " and, that if any perſon pours water on a living " torpedo, the ſenſation will be conveyed through " the water to the hand."

Oppian has gone ſtill farther, and has diſcovered the organs by which this fiſh is enabled to produce this extraordinary effect, which he aſcribes to " two† organs of a radiated texture, " which are fixed, or grow on each ſide of the " fiſh." Claudian has written a ſhort poem on the torpedo, but he mentions no qualities of it different from thoſe which have been recited above, ſave that it can convey its influence from the hook, with which it is caught, to the hand of the fiſherman. From the above accounts we ſee, that the philoſophers of antiquity had accurately obſerved the nature of this extraordinary influence, though they knew not to what

* Plutarch de Solert. Anim.

† Αλλα οι εν λαγονεσσιν αμφιλυκειης δολος αλκη,
Κερκιδες εμπεφυασι παρα πλευρην εκατερθεν
Αμφιδυμοι, των ει τις επιψαυσειε πελασσας,
Αυτικα οι μελεως σθενος εσβεσεν.

Opp. lib. II. ver. 62.

general

general principle it ought to be aſcribed. They noticed the ſenſation, and its effects on the body, the uſe the fiſh makes of this property for its defence and ſupport, and that the fiſh had the power of conveying it through wood, metals, hemp or flax, and even through water; and laſtly, that this extraordinary power was lodged in organs peculiar to the fiſh, a fact which the late accounts of the diſſection of the electrical eel farther confirm. It is remarkable, that Pliny aſcribes this power of the fiſh to a certain inviſible agency, and calls it by the ſame name* that has been applied by later writers to denominate the electrical influence.

It is farther worthy of remark, that the electrical ſhock, imparted by means of the living torpedo, was uſed in medicine. Voſſius† mentions, from ſome ancient authority, that an inveterate

* Quod ſi neceſſe habemus fateri, hoc exemplo, eſſe vim aliquam, quæ odore tantum & quadam *aurâ* ſui corporis afficiat membra, quid non de remediorum omnium momentis ſperandum eſt. Plin. XXXII. cap. 1.

† It appears to be from Scribonius Largus.

Capitis dolorem quemvis veterem & intolerabilem protinus tollit & in perpetuum remediat torpedo viva nigra, impoſita eo loco qui in dolore eſt, donec deſinat dolor & obſtupeſcat ea pars, quod quum primum ſenſerit, removeatur remedium, ne ſenſus auferatur ejus partis. Plures autem parandæ ſunt ejus generis torpedines, quia nonnunquam vix ad duas, treſve reſpondet curatio, id eſt, torpor quod ſignum eſt remediationis. Scrib. Larg. cap. 1.

head

head-ach was cured by the application of a living torpedo to the part where the pain was ſeated. The ſame remedy was alſo in uſe for the gout; the patient* being directed to place a living torpedo under his feet, as he ſtood on the ſea ſhore, and to continue it until he found the numbneſs not only affect the whole of the foot, but the leg alſo, as far as the knee. This remedy is ſaid to have cured Anthero, a freedman of Tiberius Cæſar.

Dioſcorides† adviſes the ſame remedy for inveterate pains of the head, and for protruſions of the rectum; and Galen‡ ſeems to have copied him in recommending the ſame remedy for ſuch complaints. The ſame application for the head-ach is to be found in Paulus Ægineta,‖ and I believe, ſeveral other of the later writers on medicine. An ingenious and learned Gentleman ſuggeſted to me, that it was probable, that even the method of drawing down electrical fire from

* Ad utramlibet podagram, torpedinem nigram, vivam, quum acceſſerit dolor, ſubjicere pedibus oportet, ſtantibus in litore, non ſicco, ſed quod alluit mare, donec ſentiat torpere pedem totum & tibiam uſque ad genua. Hoc et in præſenti tollit dolorem, & in futurum remediat: hoc, Anthero Tiberii libertus ſupra hæreditates remediatus eſt. Scribon. Larg. cap. XLI.

† Dioſcorid. lib. II. Art. Torpedo. Vide edit Matthioli. 1560.

‡ Galen. Simpl. Medic. lib. XI.

‖ Pauli Æginet. lib. VII. Art. Νάρκη.

the

the clouds was known in very early times, and particularly to Numa Pompilius, the ſecond king of Rome; and that his ſucceſſor Tullus Hoſtilius, periſhed by his unſkilful management of ſo dangerous a proceſs. Numa Pompilius, we know, was a Sabine, a tract comprehended in the limits of the ancient Etruria, a country from whence the Romans profeſſedly derived moſt of their religious rites and ceremonies. Diodorus Siculus informs us, that the Tyrrheni or Etruſci, Numa's countrymen, were particularly knowing in every circumſtance relative to thunder, as a branch of natural hiſtory, which they ſtudied very eagerly: γραμματα τε και φυσιολογιαν εξεπονησαν επι πλειστον, και τα περι την περαυνοσκοπιαν μαλιστα παντων ανθρωπων εξειργασαντο.

Lib. V. p. 219, edit. Rhodomanni.

Pliny ſpeaks to the ſame purpoſe. *Extat annalium memoria ſacris quibuſdam .... vel cogi fulmina vel impetrari. Vetus fama Hetruriæ eſt impetratum .. evocatum & a Porſenâ ſuo rege.* Numa himſelf was, undoubtedly, a man of ſcience. He rectified the calendar, and by intercalation brought the lunar and ſolar years to correſpond. He was acquainted with the power of a concave ſpeculum in concentrating the ſun's rays, ſo as to inflame bodies; and it was in this way that the veſtal fire was lighted. He inſtituted religious ceremonies, and formed a college of heralds, and was indeed their principal legiſlator,

in

in what regarded religion and the laws of nations. Among other acts, Livy tells us, that he built an altar on the Aventine mount to* Jupiter Elicius, whom, it was given out, that he had a power of drawing down from heaven, to explain what was portended by prodigies, and particularly by thunder and lightnings, and to advise with him on other important occasions. Arnobius, copying Plutarch, says, that Numa not being acquainted with the means of procuring thunder, which knowledge he was desirous to acquire, applied to the goddess Egeria, who taught him the method of drawing Jupiter down from heaven. Now we know, that in the Jewish religion, the visible appearance of the Deity was in the form of a flame of fire; witness the manifestation to Moses, in two instances, and the Shechinah of the temple. The same idea prevailed in the Pagan mythology; Jupiter, when he was obliged to come to Semele† with the characte-

* Quæque prodigia fulminibus, aliove quo viso, missa susciperentur atque curarentur: ad ea elicienda ex mentibus divinis, Jovi Elicio aram in Aventino dicavit, deumque consuluit auguriis, quæ suscipienda essent. Livii lib. I.

Eliciunt cœlo te Jupiter, unde minores
Nunc quoque te celebrant Eliciumque vocant.
Ovid. Fastor. lib. III. 327.

† Immissaque fulgura ventis
Addidit, & tonitrus & inevitabile fulmen.
Ovid. Metamorphos. III. 300.

The few lines above are called *Insignia* Jovis.

ristic

riſtic ſigns of his preſence, came in this manner; to draw down thunder then, and to draw down the Deity, were, according to this acceptation, the ſame thing; and this Pliny* teſtifies, as he ſays, from good authority, had been often performed by Numa. Let us now examine the account of the death of Tullus Hoſtilius. Livy† ſays of him, "that after examining the Commentaries of Numa, and finding there a deſcription of certain occult and ſolemn ſacrifices, performed to Jupiter Elicius, he ſet himſelf to execute theſe in private; but from ſome impropriety in the commencement and conduct of theſe operations, he not only failed of being favoured with any intercourſe with any celeſtial beings, but was, through the wrath of Jove, excited by his being importuned with ſuch irregular rites and ceremonials, ſtruck with lightning, and conſumed, together with his palace."

* Et ante cum a Numâ ſæpius hoc factitatum, in primo annalium ſuorum tradidit L. Piſo gravis auctor. Plin. II. 53.

† Ipſum regem tradunt, volventem commentarios Numæ, quum ibi quædam occulta ſolennia ſacrificia Jovi Elicio facta inveniſſet, operatum his ſacris ſe abdidiſſe; ſed non recte enitum aut curatum id ſacrum eſſe; nec ſolum nullam ei oblatam cæleſtium ſpeciem, ſed irâ Jovis, ſolicitati prava religione, fulmine ictum cum domo conflagraſſe. Livii. lib. I. cap. 31.

Pliny's

Pliny's * account agrees herewith. He says, that Tullus Hostilius, "whilst he was imitating "in an irregular and improper manner, the pro- "cess of Numa, for drawing down lightning, "was struck with a thunderbolt."

Dionysius Halicarnassensis † agrees, that he perished by fire, together with his family; but though he says, that many thought the burning of the palace was an artifice, to conceal the murder of the king and his family, yet himself inclines rather to the opinion that he died by lightning, on account of his improper conduct respecting the sacred rites. All agree that he perished in a storm, and during the performance of a private religious ceremony. Considering the intent of these rites, which were probably composed of some processes, which exhibited appearances of an electrical nature, it is, I think, at least probable, that he really lost his life by his unskilful management.

There is a remarkable passage in Lucan, relative to this subject. Arruns, a learned Etrurian, whom he had before described as skilled in the motions of lightning ‡, is said, by him, to have "collected the fires of lightning that were dis-

* Quod (scilicet fulminis evocationem) imitatum parum rite Tullum Hostilium ictum fulmine. Plin. lib. II. cap. 53.

† Dionys. Halicarn. p. 176, edit. Sylburgii.

‡ fulminis edoctus motus. Lucan.

"persed

perſed through the ſky, and to have buried them* in the earth. "What is this, but the deſcription "of the uſe of a conductor, to ſecure buildings "from being ſtruck by lightning?"

Let us now ſee if any probable conjecture may be formed, concerning the means or inſtruments which they employed in theſe operations. We know that the Hetruſcans and Sabines, Numa's countrymen, worſhipped† ſpears, and were, indeed, the inventors of thoſe weapons. It is probable that they might not worſhip, or employ one ſpear only in ſuch ſolemnities, but a number, perhaps a large caſe, or what Homer calls Δουρατηνη‡, or a kind of foreſt of ſpears. The firſt places of worſhip were in the open air, the word *templum*§ originally ſignifying the heaven, or ſky. Beſides, they were upon high places. The Law was delivered to Moſes upon mount Sinai: and high places are mentioned often‖ in the ſcriptures as

* Arruns diſperſos fulminis ignes
Colligit, & terra mæſto cum murmure condit.
Lucan. Phars. I. 606, 607.

† Sive quod haſta quiris priſcis eſt dicta Sabinis,
Bellicus a telo venit in aſtra Deus.
Ovid Faſt. II. 477.

‡ Odyſſ. I. 128.

§ Templum cœlum dictum eſt quia ipſum primò tuemur. Stephan. Theſaur.

‖ Levit. xxvi. 30. Numbers xxii. 41.—xxxiii. 52. 1 Kings iii. 2, 3.—xii. 31, 32.—xiii. 2, 32, 33.—xv. 14. & fere paſſim.

the ſeats of idolatrous worſhip. Now, were a foreſt of ſpears, with the points upwards, and with the handles of dry wood, or, perhaps, ſome of the Teribinthinate kind, which are bad conductors, and placed upon an elevated ſituation, they might, if placed within ſtriking diſtance, exhibit a luminous appearance, and in certain ſeaſons collect electrical fire, ſufficient to make a great diſcharge; and, as I ſuppoſe, to deſtroy any perſon within the reach of their influence. This is not altogether matter of conjecture. Plutarch ſays, that balls of fire were ſeen to reſt on the points of the ſoldiers' ſpears, and we know, that in our own times, in the Mediterranean ſea, it is common for balls of fire to reſt on the rigging of the ſhips, which appearances were formerly called by the names of Caſtor and Pollux; and in later times, the fires of St. Helmo, and are thought to foretel good weather. Was it from this opinion, that St. Paul's ſhip, mentioned in the Acts of the Apoſtles, had the images of Caſtor and Pollux on its prow. Livy* ſpeaks of a ſpear, in a houſe, that burned more than two hours, yet without being conſumed. Could this be any thing but electrical?

It ſhould be obſerved, that Numa did not build a temple, but an altar, in the open air, to

* Fregellis in domo L. Atrei haſta, quam filio militi emerat, interdiu plus duas horas arſiſſe, ita ut nihil ejus ambureret ignis, dicebatur. Liv. XLIII. 13.

Jupiter

Jupiter Elicius, and that it was ſituated on a hill, namely, the Aventine Mount. But Tullus Hoſtilius, it is ſaid, was in ſome retired part* of his houſe, and alone.

A ſpear, however, might become electrical in a thunder ſtorm, in which Tullus Hoſtilius is ſaid to have periſhed, even in a houſe; witneſs the ſtory from Livy, mentioned above; but we may ſuppoſe, that he might be on the houſe top, which was a common place of worſhip, and there have erected his apparatus for drawing down lightning. That this was a common place for idolatrous worſhip, we learn from the ſcriptures. The book of Kings† ſpeaks of the altars, that were on the top of the upper chamber of Ahaz. Jeremiah‡ ſpeaks of "the "houſes, upon whoſe roofs they have burned "incenſe unto all the hoſt of heaven, and have "poured out drink-offerings to the gods." Zephaniah‖ mentions thoſe "that worſhip the hoſt of heaven on the houſe tops." Might not

* μελλοντος δε Τυλλου θυσιαν τινα κατ' οικον επιτελειν, αυτους μονον εβουλετο τους αναγκαιους ειδεναι, κατα τυχην της ημερας εκεινης χειμεριου σφοδρα γενομενης, κατα τε ομβρον και ζαλην και σκοτον. Dionyſ. Antiq. Rom. lib. III. p. 176, edit. Sylburg.

Is it not probable from hence, that theſe ſacrifices were commenced on the approach of ſtorms?

† Kings, book II. chap. xxiii. 12.

‡ Jerem. xix. 13. ‖ Zephaniah i. 5.

then Tullus Hoſtilius, ſuppoſing him placed in an elevated ſituation, and upon the top of a building, and ſurrounded by, or in the neighbourhood of a number of ſpears, placed with their points upwards, receive a ſtroke by their means from an electrical atmoſphere; or might not an electrical cloud be ſo attracted and diſcharged upon a multitude of metalline points, terminating in bad conductors, as to explode and deſtroy him, and burn the houſe: and might not Numa be inſtructed, how to conduct this proceſs with greater ſafety, though, perhaps, not ſcientifically? But many a houſe is preſerved by conductors, whoſe inhabitants, and even the artificers that erected them, are nearly ignorant of the rationale of the matter.

Essay *on ſome ſuppoſed* Druidical Remains, *near* Halifax *in* Yorkshire; *by Mr.* Thomas Barritt.

read october 19, 1787.

About a mile weſtward of Saddleworth church, in the county of York, is a high hill, which commands an extenſive proſpect over the adjacent country. It is called, by the neighbouring people, pots and pans. Upon the ſummit

Pots and Pans a Druidical Remain in Saddleworth

Rock-Bason *Rock-Idol*

NATURAL HISTORY

ſummit are abundance of large craggy ſtones, (of that ſort generally called mill-ſtone grit) lying ſcattered up and down, which, when viewed from the eaſt, look like the foundation or ruins of ſome ſtupendous fabric. One of theſe ſtones, or rather two of them cloſely joined together, is called the PANCAKE; it is of an irregular ſquare form, with obtuſe angles, and hath upon its ſurface four baſons, hollowed in the ſtone; the largeſt, being nearly in the center, is capable of holding eight or ten gallons of water, ſome ſay more: whether theſe hollows be natural, or artificial, is not known. This ſtone I meaſured, and found to be about ſeventy-ſix feet in circumference: another long uneven hole, upon this ſtone, is called Robin Hood's bed. A little weſtward of this, is another ſtone, about twenty feet in height, and about fifty-ſix feet in circumference at the baſe, but much narrower at the top, from whence proceed irregular flutings or ridges, down one ſide, of about two feet long, by ſome ſuppoſed the effect of time, and by others the workmanſhip of art. More weſtward, and nearer the valley of Greenfield, the ground is called Aldermans, and overlooks that valley, oppoſite to a large and high rock called Alphian. Upon the level of this ground, is a fiſſure in the earth, about twelve or fourteen yards long, each end terminating in a cavernous hole in the rock, one of which is capable of ad-

mitting dogs, foxes, or ſheep; the other large enough to receive men. Neither of theſe cavities has been thoroughly explored by any one within memory; a perſon informed me that he had gone into the larger with a light, but returned, after having gone down a ſloping deſcent of about ſixty yards: tradition ſays, into the other hole once went a dog, in full chace after a fox, but neither of them ever returned.

To a ſuperficial obſerver, unacquainted with ancient hiſtory, and buſied only with the common occurrences of the preſent day, theſe rude remains may appear to be no more than the ſport, or chance of nature, thus left, when the water of the general deluge quitted its earthly ſeat, and fixed its reſidence in its proper bed.

To gueſs at the tranſactions of remote ages, where we have no written authority, is, it muſt be owned, too often fallacious, and at beſt very uncertain; and ſome, whoſe purſuits do not coincide with ſuch reſearches, may ſlight thoſe attempts, which might lead to a diſcovery of actions ſo far back as "twice ten hundred years;" yet where we cannot attain complete knowledge, it is humbly preſumed, a probable conjecture may be admitted.

Upon this ground of conjecture we may go, and ſay, that ſituations like theſe, and ſtones like thoſe we deſcribe, have been made uſe of in the moſt ancient idolatry, and particularly by the Druids of this iſland; who, as prieſts of its firſt inhabitants,

inhabitants, performed the rites of their religion upon high grounds, as moſt ſuitable to the ſolemnity of their worſhip; and as they might ſuppoſe the Deity to be more propitious, when addreſſed from a lofty eminence, "they wor-"ſhipped the whole expanſe of heaven, and had "open temples." Sacred hiſtory aſſures us this was the cuſtom amongſt idolatrous nations in the eaſt. We are told in the hiſtory of the Jewiſh kings, that Joſiah, zealous in the worſhip of the true God, went about to reform the Iſraelites, who had fallen into idolatry; that he deſtroyed the groves, the temples, and the high places that were before Jeruſalem, and on the right hand of the mount of Corruption, which King Solomon had built for Aſhtoreth, the idol of the Sidonians, and for Chemoſh, the idol of the Moabites, and for Milchom, the abomination of the children of Ammon. The margin of our old Bibles informs us, it was the mount of Olives, that was called the mount of Corruption, becauſe it was full of idols.

Now it may be allowed, that the reſidence of a Druid, thus elevated upon a mountain, would the better command reſpect from a ſurrounding crowd, who had an opportunity, for many miles around, of beholding the ſmoke aſcend from a burning ſacrifice.

The ſtone called PANCAKE, I ſhall venture to point out, as an altar once uſed for ſacrifice, for

libations, for offering the fruits of the earth, for divination by the entrails of beaſts, the flight of birds, by water, and other methods now not known.

Borlaſe, in his Antiquities of Cornwall, gives us a very accurate and learned account of Druidical hiſtory, and deſcribes theſe ſtones, or karns, with great minuteneſs; and whoever will take the trouble to read his work, may be thoroughly convinced, that theſe ſtones in Saddleworth were originally for the ſame uſe with thoſe which he deſcribes in Cornwall.

In ſpeaking of hollows, or baſons, he ſays, "Theſe baſons are generally found on the higheſt "hills, and on the tops of the moſt conſpicuous "karns: ſome are found ſunk into thin flat "ſtones, but they are oftener worked into more "ſubſtantial and maſſive rocks." He ſeems not to allow of their being "deſigned for altars *, either of ſacrifice, of libation, or holy fires;" but I muſt ſay, that the ſtone called PANCAKE, might be accommodated to thoſe purpoſes with care. He thinks theſe baſons wholly calculated for the Pagan ſuperſtitions of "luſtra-"tion and purifications by water. The pureſt "of all water is that which comes from the "heavens in ſnow, rain, or dew; and of this "the ancients were not ignorant; and therefore

* Borlaſe allows that ancient heathen prieſts did ſacrifice upon rocks.

"no

" no water ſeems to bid more juſtly for the " preference in thoſe ſacred rites, than this.

" It may with great probability be advanced, " that ſo ſtrict a ſect as that of the Druids " could not be ignorant of ſo univerſal a cuſ- " tom, nor knowingly forbear to adopt ſo anci- " ent and ſpecious a rite for a part of their ſyſ- " tem: my opinion, therefore, is, that the " Druids, as well as other prieſthoods, had the " rites of external purification by waſhings and " ſprinklings; for this, they had their holy " water; that this holy water was rain or ſnow, " or probably both; and that theſe rock-baſons " were veſſels moſt ingeniouſly contrived to " procure that holy water. They likewiſe had " their waters of jealouſy, as well as the Jews, " and, near the banks of the Rhine, uſed the " waters of that river to purge the ſuſpected.

" Theſe baſons are moſtly placed above the " reach of cattle, frequently above the inſpec- " tion of man." Theſe long hollows, ſuch as Robin Hood's bed upon the ſtone called PAN-CAKE, Borlace ſuppoſes " were to receive " the bodies, of men and children for particular " diſorders, that by the healing virtue attri- " buted to the god, who inhabited the rock, " they might be cured of their ailment; or, " by being proſtrated on ſo holy a place, might " be fitted for, and conſecrated to the ſervice

" of

" of the rock deity, for which they were in-
" tended."

In confirmation of the above, a notion hath prevailed to the prefent day, that the water in the bafon, in the center of PANCAKE, will cure fore eyes, which fuperftition, I fuppofe, hath continued from the Druid-times, and feems to eftablifh the exiftence of Druidifm in this part of the country.

The water in the rock-bafons, might ferve to mix with their miftletoe, which was looked upon as a general antidote.

About half a mile north of PANCAKE, are feveral large ftones piled upon each other, upon the higheft of which is a hollow, or bafon; thefe are called STAPELEY STONES. What the word ftapeley may fignify, is uncertain; it may come from the Belgic word ftapel, a fettled market; perhaps in this place neceffary articles were fold to the Druids, and others who came to worfhip, the venders not being permitted to approach any nearer the facred ground.

Similar ftone bafons are faid to be found upon the commons, fome miles diftant, in the fame county, which were allowed (by that able and judicious antiquary, the late Rev. Mr. Watfon, rector of Stockport, in Chefhire) to be Druidical remains. Not far from this ground alfo, was found the ftone celt, defcribed by the Rev.

Rev. Mr. Whitaker, in his hiſtory of Manchester.

The large upright ſtone, about twenty feet in height, erected at ſome little diſtance from PANCAKE, I ſhould fix upon as the ſtone, or idol, once here worſhipped; around it are many very large ſtones, lying in all directions, as if tumbled one from off another. The general form of this ſtone is that of a large irregular wedge. Borlaſe ſays, "the Phœnicians adored deities of this form." The holes deſcribed before may be conſidered as highly neceſſary in the buſineſs of Pagan deception; from them anſwers might be given, and ſounds and horrid noiſes might be heard, produced by perſons concealed there for the purpoſe of aſtoniſhing deluded people, and by theſe ſecret ways, maintaining the credit of the Druidical hierarchy*.

Ancient hiſtory informs us, that the prieſt of Apollo, at Daphne, near Antioch, when delivering his oracles, ſat upon a ſmall ſeat like a buſhel, pierced with many holes, and placed over an aperture of the floor of the temple, through which the gale of inſpiration was thought to ariſe.

It is not improbable that this part of the country was early peopled by thoſe Celtæ, who

* Theſe conjectures are much ſtrengthened by Major Rooke's obſervations on Druidical remains, publiſhed in the Archæologia.

owed

owed their extraction to Phœnicia in Syria; ſince we find the Celtiberi of Spain to be of Phœnician origin, as well as the founders of ſeveral cities in Italy; and it may be difficult to prove the Celtæ of old Gaul, who inhabited between the rivers Garonne and Seine, to have ſprung from any other ſource. Almoſt all writers agree, that the firſt inhabitants of this iſland had an intercourſe with the Phœnicians, who are allowed to have traded to Britain, from thoſe once famous ſea ports Tyre and Sidon; and where they left a colony, would no doubt leave with them, all the rites and ceremonies of their Syrian worſhip.

If it be admitted, that this hill has been dedicated to heathen worſhip, the ground called Aldermans, I ſhould imagine to extend to the place where the idol once ſtood. The word Aldermans, I ſuppoſe not to be its original name, but to have been afterwards given by the Saxons, ſignifying, in their language, the elderman, or oldman, from a rock-idol or ſtone pillar, there once worſhipped, by the Celtic Britons, the true name of which was unknown to the Saxons.

We read in the Levitical law, that Moſes forbid the Iſraelites to rear up a ſtanding image, or ſet up any ſtone in their land, to bow down to it or worſhip it. The adoration of ſtones was common at that day, we read, or why forbidden? So that upon the whole I ſhould conclude, that

that a rude ſtone pillar was once worſhipped upon this hill; and the ſtone called PANCAKE, the altar, and the ſtones now lying diſperſed about, once formed (though of rude materials) an heathen temple, which upon the prevalence of chriſtianity, and the riſe of more enlightened times, was deſtroyed, nay, is even to this day waſting more and more.

I was informed when there, that young people would aſſemble in fine weather, and with iron crows, and levers, amuſe themſelves by removing theſe large and ponderous ſtones from off each other, for the purpoſe of trying how far they would tumble, and how long they would be in rolling down the ſloping hills. Thus we ſee the devouring teeth of time, determined, ſcarcely to leave one ſtone upon another upon this once ſacred ground.

At Mow-Cop in Cheſhire, is a rude upright ſtone pillar, called the Oldman at Mow, and ſaid, by the country people, to be an idol, perhaps once uſed for idolatry, at the ſame time with this in Saddleworth.

Account of an ANCIENT MONUMENT *in* HULN ABBEY, NORTHUMBERLAND; *by* JOHN FERRIAR, M. D.

READ MARCH 28, 1788.

THE monument here exhibited, was dug up, a few years ago, from among the ruins of the church of Huln Abbey, now in poſſeſſion of the Northumberland family. The table is broken, as marked in the drawing.

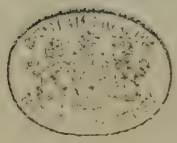
No account of this curious monument has yet been publiſhed, and it is ſo covered with ivy, in its preſent ſituation, at the weſt end of the church, as to eſcape the obſervation of travellers; who are generally attracted to viſit the remains of the abbey, by the uncommon beauty of its ſituation, more than by antiquarian zeal.

Huln abbey, the firſt Carmelite monaſtery founded in England, was built in 1240, by Ralph Freſborn, under the patronage of William de Veſcy, then Lord of Alnwick, and of the immenſe poſſeſſions of the Tyſons, granted to Ivo de Veſcy by the Conqueror. During the laſt of the Croiſades, Veſcy, with ſome other Northumbrian Gentlemen, viſited the monaſtery on mount Carmel. They found there Freſborn their countryman,

MONUMENT

In the Church of Hulne Abbey Northumberland

Drawn on the Spot.



tryman, one of the religious, and became ſo attached to him, as to deſire that he might be permitted to return with them to England. The ſuperior agreed to their requeſt, on condition that Freſborn ſhould found a Carmelite monaſtery in his native country. Freſborn choſe a ſpot near the caſtle of his friend, to fulfil his obligation; the land was granted by Veſcy; and Freſborn became the abbot. Tradition ſtill denominates one of the largeſt towers of Alnwick caſtle, the Abbot's tower.

Some fancied reſemblance to mount Carmel determined the ſite of Huln abbey. It is controverted, (as all truth is important) whether the hill on which the abbey ſtands, or an oppoſite eminence, were the object which occaſioned this choice. However difficult this point may appear, it would ill become a lover of antiquity to omit an opportunity of deciding by conjecture. I muſt confeſs, then, it appears from a compariſon with prints, that the ſite of the abbey reſembles Carmel, and that the oppoſite rock, riſing in a fine cone, almoſt from the brink of the river, has the appearance of mount Tabor.

But there needed not theſe aſſociations of romantic devotion, in favour of a place, which, in Sandys's phraſe, "would make ſolitarineſs "delightful, and ſtand in competition with the "turbulent pomp of cities."

Here,

Here, De Veſcy was probably buried, and I conceive the monument before us to have formed the covering of his ſtone coffin,

It appears, from an inſpection of many ancient monuments, that the croſs was a common ornament for the covers of ſtone coffins, both before and after the conqueſt. Several ſpecimens of this kind are brought together, in Gough's ſepulchral monuments: in ſome, the croſs is accompanied with the armorial bearings of the perſon interred. Our artiſt, with more taſte, has introduced the arms and inſignia of Veſcy, in a kind of trophy, with very elegant fillets. I am not quite ſatisfied about the meaning of the wheel contained in the creſt. Moſt of the croſſes I have mentioned have a circular ornament on the top, ſometimes encloſing a quatrefoil. The wheel, in this inſtance may allude to Veſcy's travels. Or more probably it is that bearing known in books of heraldry, by the name of the *Catherine-Wheel*; a bearing, according to the Accidence of armory, proper to the moſt honourable perſons only. It would be inaccurate not to obſerve, that the form of this wheel is different from that given to the Catherine-Wheel by the heralds; for in this before us, there are two concentric circles, in the outer of which, radii, like ſpokes, are drawn to the circumference; but whether this be a piece of ingenious flattery, by which the honour of the wheel is doubled, or whether

whether it refers to ſome particular incident in De Veſcy's life—I believe we cannot determine.

The ſhield charged with a plain bend, on the right of the trophy, is ſaid to be the ancient bearing of the Northumbrian Veſcys. To whom the ſhield charged with a chevron, on the left, belonged, I have attempted in vain to determine. I do not remember, that it is to be found among the numerous eſcutcheons diſplayed on the gateways of the caſtle and abbey of Alnwick. Perhaps, in this inſtance, Time, in mockery of human pride, has reſtored the ſymbol of a family whoſe name and memory have periſhed. The ſword and bugle horn, ſuſpended on different ſides of the trophy, intimate the baronial quality of the deceaſed. The monument, therefore, certainly commemorates a Baron de Veſcy. But I am led to believe that this Baron was the patron of the monaſtery, not only from the place where the monument was found, but from a note in the old plan of the abbey, firſt publiſhed by Mr. Groſe. *The Founder's tomb* is there marked, at the eaſt end of the church, but no notice is taken of it, in the ſurvey which accompanies the plan.

As it is a point undecided by authors, whether Freſborn erected the building at his own expence, or whether the munificence of his friend ſupplied that, as well as the park; and chiefly

becauſe I am inclined to be of the latter opinion; I apprehend that the title of founder of the monaſtery could only belong to William de Veſcy. It is well known that the tombs of founders and benefactors of religious edifices were generally placed near the altar; and nobody could ſay to a Norman Baron, *immemor ſepulchri ſtruis domos.*

So much of the monument of William de Veſcy.—A vindication of this little diſquiſition may appear neceſſary to thoſe who condemn the ſtudy of antiquities, as uſeleſs or uncertain. But I have ever thought, that purſuits, which add to the innocent happineſs of life, are too reſpectable to require defence. A knowledge of antiquities implies labour and erudition, and I do not know that it diſpoſes either to vice or folly. The charge of uncertainty can never be brought againſt this kind of knowledge, without recoiling on all ſyſtems; and a true philoſopher will beware of under-valuing any reſearches into human life; eſpecially ſuch as intereſt our nature ſo ſtrongly, as thoſe of the antiquarian. For every one muſt feel, in ſome degree, on ſurveying the works of former ages, thoſe ſentiments, ſo well expreſſed in that exquiſite paſſage, which Mr. Groſe has ſelected, as the motto of his Engliſh antiquities;

> I do love theſe ancient ruins;
> We never tread upon them but we ſet
> Our foot upon ſome reverend hiſtory.

And

And queſtionleſs, here, in this open court,
Which now lies naked to the injuries
Of ſtormy weather, ſome men lie interred,
Lov'd th' church ſo well, and gave ſo largely to't,
They thought it ſhould have canopy'd their bones.
Till doomeſday. But all things have an end.
Churches and cities, that have diſeaſes like to men,
Muſt have like death that we have.

On the NATURE *and* UTILITY *of* ELOQUENCE; *by* RICHARD SHARP, F. S. A.

"Fructu, et populari eſtimatione, Sapientia Eloquentiæ cedit. Ita enim Salomon, *ſapiens corde appellabitur prudens, ſed dulcis eloquio majora reperiet*; haud obſcuré innuens, Sapientiam famam quandam, et admirationem cuipiam conciliare, at in rebus gerendis et vita communi, eloquentiam præcipué eſſe efficacem."

Bacon de Augm. Scien. lib. VI. cap. 3.

READ NOVEMBER 2, 1787.

I MUST hope to be forgiven, for owning that I conſider myſelf as running ſome riſque, in venturing to ſolicit the attention of the Society, when I have nothing to offer but a few thoughts concerning ſuch a kind of ſubject as Eloquence. Generally prevalent as the ſtudy of Phyſiology is at preſent, in this kingdom, and particularly culti-

vated as this ſcience is by ſo many of the moſt eminent members of the Society, I ſhould be ſomewhat ſurprized if the philoſophy of the fine arts were held in much eſtimation. I never could, and I hope I never ſhall allow myſelf to ſpeak, or think diſreſpectfully of other men's purſuits, merely becauſe they differ from mine; but ſurely I may be permitted to ſay, that the ſtudy of that grand and ſeducing ſcience, Natural Philoſophy, has a tendency to excite in its followers, low ideas of arts as uſeful as any that can be founded even upon its nobleſt diſcoveries. It is true, that in diſtinguiſhing the arts from each other, the fine arts have been uſually oppoſed to the uſeful; but is not this improper? and would it not be better to conſider them as divided into the liberal and the mechanical? Had I thought eloquence to be a fine art only, in the common ſenſe of that term, I ſhould, in the firſt inſtance, have probably ſaved myſelf the trouble of thinking or writing about it at all, but, in the ſecond, I ſhould certainly have ſpared the Society the trouble of reading what I had written. Eloquence, ſo far as it is an art, is undoubtedly claſſed with propriety, among the fine arts, ſince the means it uſes to effect its purpoſes are not mechanical, and inaſmuch as it is ſo conſtantly connected with the ſtrongeſt exerciſes of the imagination; but ſurely it can never be excluded from an eminent place among the uſeful arts;

arts, ſo long as men have prejudices to be attacked; fears to be allayed; hopes to be excited, or paſſions to be moved; and ſo long, it may be added, as they have underſtandings to be informed. For, perhaps, the moſt extenſive field for the diſplay of real ability in ſpeaking, is the rich, the vaſt, and hitherto uncultivated tract of *probable evidence.*

Within the ſphere of demonſtration indeed, eloquence has but little to do, having only room enough to exhibit two of her loweſt qualities, perſpicuity and order: but demonſtration, though abſolute ſo far as her power extends, reigns over a very narrow territory. I will not preſume to go quite ſo far as D'Alembert, and ſay of eloquence, "Les prodiges qu'elle opere ſouvent "entre les mains d'un ſeul ſur toute une na- "tion, ſont peut être le témoignage le plus "eclatant de la ſuperiorité d'un homme ſur un "autre*;" but ſtill, that art which teaches us how we are likely, in the moſt effectual manner, to make ourſelves maſters of other men's minds by ſpeech, muſt be permitted to rank very high in the ſcale of uſeful ſtudies.

It has in truth been common with thoſe men of ſenſe, who have themſelves been deficient in expreſſion, to ſpeak with contempt of the eloquence of others, and to repreſent it as uſeleſs

* Diſcours preliminaire a l'Encyclopedie.

at leaſt, if not highly dangerous; nay, ſome men have very dexterouſly and ſucceſsfully uſed the art itſelf to decry its importance, and vilify its tendency*. *Quod ſit indigniſſimum*, ſays Quintilian, *in accuſationem orationis, utuntur orandi viribus* †.

"It is evident," ſays Mr. Locke, "how "men love to deceive, and be deceived, "ſince rhetoric, that powerful inſtrument of "error and deceit, has its eſtabliſhed pro- "feſſors, is publicly taught, and has always "been had in great reputation ‡." What "is the end of eloquence," ſays Warburton in the chapter already referred to, "but "to ſtifle reaſon, and inflame the paſſions?" The prejudices of Mr. Locke were undoubtedly honeſt, but they plainly ſhow that he miſtook the abuſe of the art for the art itſelf; and happily for mankind, my Lord Bacon's obſervation is true ‖: "No man can well ſpeak fair of "things ſordid and baſe, but in things honeſt

* The inſtances of this ſelf-condemning cenſure are very numerous, but there are few examples of it ſo remarkable, or ſo entertaining, as a long paſſage in Plato's Gorgias, and another in the ninth chapter of Warburton's Doctrine of Grace.

† Lib. II. cap. 15.

‡ Eſſay on Human Underſtanding, book III. ch. 10.

‖ De rebus ſordidis, et indignis non poſſe quempiam pulchre loqui, at de rebus honeſtis facillime. De Augm. Scient. lib. VI. cap. 3.

"it

" it is an eaſy matter to be eloquent." To the Biſhop's authority it may be objected, as Thucydides ſays it was to Cleon's, " that becauſe " he uſed to hold the bad ſide in the cauſes he " pleaded, therefore he was ever inveighing " againſt eloquence and good ſpeech *." It were eaſy to multiply the examples of ſuch miſrepreſentations; the ſophiſts and the fathers of old, the metaphyſicians and theologians of late, have united in abuſing an art, which they wanted judgment as well as taſte to underſtand. Yet in all the various inſtances of theſe inconſiderate attacks, it ever appeared to me, that the objections and cenſures conſtantly aroſe from a miſconception of the real nature of the art.

How often is the epithet eloquent applied to ſome ignorant coxcomb, who in every geſture, look, and word, offends againſt the firſt rudiments of ſpeaking! forgetting, *Ars eſt celare artem!* How many times muſt every man have heard the title of Orator given to ſome wretched phraſe-monger, whoſe ſkill conſiſted only in the frequent uſe of a gaudy word, or an affected antitheſis! Thus has this efficacious and important art become diſreputable, and been of courſe diſregarded by many great and wiſe men, even among thoſe whoſe profeſſions are con-

* Thucyd. lib. III.

nected with the daily practice of public speaking. But this misconception is far from being peculiar to those who have not attended to the subject; for perhaps it is hardly possible to produce any definitions of rhetoric from the ancient, and there are but few to be found in the modern writings that treat of it, which do not either lay it open to just objections, or degrade its importance, by confining its powers and its application.

It cannot but have been matter of some surprize to such as are conversant with the works of the most celebrated Rhetoricians, that they should differ so generally and so widely respecting the nature of the art which they profess to teach. In the fifteenth chapter of his second book, Quintilian states and refutes a great variety of differing definitions, which, even in his time, had been given of rhetoric, and he censures among others, those that rested on the formidable authority of names no less eminent than Isocrates, Plato, Aristotle, and Cicero. He then proceeds to express and support his own opinion; but with less skill, and less success than he had attacked the sentiments of his predecessors. The same irreconcileable variety of opinion prevails among later writers, on this subject, which, to say the truth, has been considered by so many able authors, and by some of such exalted reputation, that I

chuse

chuſe to mention this difference among them, as an apology for preſuming to go over the ground which ſuch men have trodden. Since all cannot be right where all diſagree, the authority of one ſerves to counterbalance that of another; and thus a man may be allowed to differ from any of them, without dreading the imputation of vanity. Ariſtotle ſays it is the office of rhetoric

"Ο'υ τὸ ΠΕΙΣΑΙ ἀλλὰ το ἰδεῖν τὰ ὑπαρχοντα ΠΙΘΑΝΑ περιέκασλον." Rhet. lib. I. C. 1.

"Officium autem ejus facultatis videtur eſſe, dicere appoſité ad perſuadendum." Cicero de Inven. lib. I. S. 5.

"Nihil enim eſt eloquentia, niſi copioſé loquens ſapientia." Cicero Orat. Part. S. 23.

"Scientia bené dicendi." Quin. lib. II. cap. 15.

"Eſt igitur frequentiſſimus finis rhetorices *vis* "*perſuadendi*. Hæc opinio originem duxit ab "*Iſocrate*: apud *Platonem* quoque idem fere di- "cit." Quin. lib. II. cap. 15.

"L'Eloquence eſt le talent d'imprimer avec "force, et de faire paſſer avec rapidité, dans l'ame "des autres le ſentiment profond dont on eſt pene- "tré." D'Alembert ſur l'Elocution Oratoire.

"Oratory is the natural faculty of ſpeech "improved by art." Dr. Preſtley's Lectures on Oratory and Criticiſm.

"Eloquence

" Eloquence is the power of ſpeaking with fluency and elegance." Dr. Johnſon's Dictionary.

" Eloquence is the art of ſpeaking or writing well, ſo as to move and perſuade. "Chambers's Cyclopædia. Dr. Rees's Edit.

This is but a ſmall ſample of the various modes of ſpeaking concerning the ſubject; but no more need be produced, and to me all theſe appear either falſe or imperfect. Perhaps the moſt ſenſible, moſt ſubſtantial, and moſt uſeful idea of eloquence, is that expreſſed by Dr. Campbell, in the firſt ſentence of his PHILOSOPHY OF RHETORIC. " Eloquence is that art or talent by which a diſcourſe is adapted to its end." The ſame ſentiment is intimated by Quintilian, when he ſays, *Quo quiſque plus* efficit *dicendo, hoc magis ſecundum naturam eloquentiæ dicit**. " Whatever compoſition †," ſays Mr. Wilkes, in one of his ſpeeches, " produces the effect which is " intended, in the moſt forcible manner, is, in " my opinion, the beſt, and moſt to be approved. That mode ſhould always be purſued: " it has the moſt merit, as well as the moſt ſuc-

* Lib. XII. cap. 10.

† Inſtead of " whatever compoſition *produces* the effect," he ſhould have ſaid, whatever compoſition is *beſt calculated to produce* the effect. The paſſage would then be incontrovertible.

" ceſs,

" ceſs, on the great theatre of the world, no " leſs than on the ſtage, whether you mean to " inſpire pity, terror, or any other paſſion." It may, perhaps, be objected, that the word eloquence has generally been uſed in a more limited ſenſe, and to ſay the truth, it has by many been applied to denote ornamental compoſition only: but has not this ariſen from a miſtake, by which a part of the art has been taken for the whole? This has been the caſe with poetry, and it is amuſing to obſerve the difficulties into which the error has brought many learned men, in their attempts to ſettle the nature and eſſential qualities of this noble art. Some have thought it's nature to conſiſt in imagery, ſome in imitation, ſome in fiction, ſome in metre, and in others in paſſion; whereas, theſe are only ſo many different means employed by the poet to effect his purpoſes, and are all mere parts of that, of which it has been ſuppoſed they conſtitute the eſſence. However, let the common meaning of the term be what it may, we are not now conſidering the proper acceptation of a word, but the real nature of a ſerious art. The exiſtence of ſuch an art can hardly be doubted, for that would be to queſtion whether men ſpeak beſt by accident or by deſign; when they take no thought, or when they previouſly conſider what they are about to do. Nature, it muſt be confeſſed, does much, and will not only lead, but compel us,

on

on intereſting occaſions, to uſe thoſe forms of ſpeech (even the moſt complex) which rhetoricians have arranged and named. Perhaps no language is more *natural* than that which abounds with figure and alluſion. Yet ſtill ability alone is not ſufficient; and a living man, of high rank in politics, might be pointed out, who, though gifted far beyond any of his cotemporaries, and greatly ſuperior to them in acquirements, has yet been often found an uſeleſs, and ſometimes a dangerous auxiliary, becauſe he wanted the ſkill to manage his prodigious powers. He is ever ſaying ſomething only for the ſake of ſaying it; merely becauſe it is ſingular, beautiful or ſublime, and without any regard to its effect on his auditors. A real thought he never can diſmiſs, till he has made it the ſubject of innumerable compariſons, or darkened it by ſuperabundant illuſtration. If it be poſſible for ſuch a waſte of talents to be occaſioned by a deficiency in the art we are ſpeaking of, it may not be amiſs to conſider, whether the definition of it given by Dr. Campbell be the true one, and, at the ſame time, to examine the opinions of the other celebrated writers, whoſe definitions I have quoted, as they are maintained and defended by two authors of great reputation, and of peculiar abilities for the diſcuſſion of ſuch a ſubject, Dr. Browne and Dr. Leland, both of whom have ſtated their ſentiments at length; the former in his

his ESSAY ON RIDICULE, and the latter in his DISSERTATION ON THE PRINCIPLES OF HUMAN ELOQUENCE.

Dr. Browne ſpeaks thus: "As eloquence is of "a vague, unſteady nature, merely relative to "the imaginations and paſſions of mankind, "ſo there muſt be ſeveral orders and degrees "of it, ſubordinate to each other in dignity, "yet each perfect in its kind. The common "*end* of each is perſuaſion: the means are dif-"ferent, according to the various capacities, "fancies and affections of thoſe whom the artiſt "attempts to perſuade. The pathetic orator "who throws a congregation of enthuſiaſts into "tears and groans, would raiſe affections of "a very different nature, ſhould he attempt to "proſelyte an Engliſh parliament. As on the "other hand, the fineſt ſpeaker that ever com-"manded the houſe, would in vain point "the thunder of his eloquence on a quaker "meeting." Eſſay on Ridicule, ſect. III. p. 32.

Of this paſſage, ſays Dr. Leland; "This is "plauſibly and ingeniouſly urged, but the whole "argument is founded on the ſuppoſition, that "eloquence and perſuaſion are one and the "ſame, and that to be denominated an orator, "no more is neceſſary than to influence and "move the hearer. A ſuppoſition which can-"not be admitted, however witty men may

"have

" have talked of the ' eloquence of *ſilence*,' or " the ' eloquence of *nonſenſe*.' *Perſuadent enim di-* " *cendo*," ſaith Quintilian, " *vel ducunt in id quod* " *volunt, alii quoque meretrices, adulatores, cor-* " *ruptores.* (lib. II. cap. 16.) The alluring ac- " cents of an harlot move the ſenſualiſt; the " abject and extravagant praiſes of a flatterer " move the vain man; and the plain promiſe of " a large reward, expreſſed without trope or " figure, may have the greateſt power over the " conduct of a traitor or an aſſaſſin. But it will " by no means follow, that the harlot, the flat- " terer, or the ſuborner is *eloquent.* To merit " this praiſe a man muſt perſuade (if he does " perſuade) by the real excellencies, the engag- " ing and conciliating qualities of ſpeech. Ac- " cordingly, Ariſtotle tells us it is the office of " rhetoric, *videre quæcunque appoſita ſint ad per-* " *ſuadendum in quaque re.* So that the doctor's " orator, who throws a congregation of enthu- " ſiaſts into tears and groans, is, in reality, no " orator at all, becauſe he owes his influence, " not to clearneſs and ſtrength of reaſoning, not " to dignity of ſentiment, force, or elegance of " expreſſion, and the like, but to ſenſeleſs ex- " clamation, unmeaning rhapſody, or to gri- " mace, to a ſigh, to a rueful countenance; " and if he would in vain endeavour to proſe- " lyte an Engliſh parliament, it is for this very " reaſon, becauſe he is no orator, nor can any

" man

" man without any one of the *appoſita*, the ra-
" tional excellencies and engaging qualities of
" ſpeech, be ſaid to poſſeſs a degree of elo-
" quence perfect in its kind." Leland's Diſſer-
tation, ch. XIV.

What Leland ſays of Browne's, may be as juſtly ſaid of his own argument, that it is plauſibly and ingeniouſly urged; but probably the opinion of neither is true. Although it may be acknowledged that " Eloquence is relative to the imaginations and paſſions of men," yet it does not therefore follow, that it is of a " vague, unſteady nature." It might as juſtly be ſaid, that the art of muſic is of a vague, unſteady nature, becauſe it produces compoſitions ſo infinitely various; or that the art of the painter is liable to the ſame reflection, becauſe it is ſometimes exerciſed on copper and ſometimes on canvas. The arts themſelves are fixed, ſteady and immutable; it is only the objects on which they operate, that are various and periſhable. Neither is it true, that the *only end* of all eloquence, is perſuaſion. An orator undoubtedly often aims to perſuade, but he generally has ſome other end in view. He frequently wiſhes to alarm, to rouſe, to depreſs, to excite our pity, or to fire our indignation, and ſometimes is only deſirous to delight the imagination. Now theſe different objects can never be reduced under the general head of perſuaſion,

ſuaſion, without departing moſt unwarrantably from the common acceptation of that term. The ingenious inſtances adduced in the laſt ſentence of the quotation from Browne, are certainly not ſufficient to prove either of his poſitions, namely, that eloquence is of a vague, unſteady nature, or that the common end of all eloquent diſcourſes, is perſuaſion. The anſwer juſt given to the principles themſelves, will alſo deſtroy the application of theſe inſtances. And, in truth, the facts which he takes notice of may be accounted for, in a much more reaſonable and unobjectionable manner.

That the methodiſt preacher would produce no other effect, in parliament, but that of making himſelf ridiculous, is unqueſtionable, and why? becauſe, in attempting to affect the houſe, by the uſe of the ſame means as thoſe that are ſucceſsful in his own pulpit, he would ceaſe to be eloquent. He would be violating one of the fundamental rules of rhetoric, which teaches us, that a ſpeaker ought to have a conſtant regard to the quality of his audience. His ill ſucceſs, therefore, would be owing to his want of art. He would fail, becauſe he was ineloquent. The eloquence which he had diſplayed on his own ground would ſtill remain unimpeachable, and he would be in a ſituation ſimilar to that of a ſtatuary, who is able to exerciſe his art only upon marble.

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The ſame reaſoning is juſt as applicable to the parliamentary ſpeaker, who ſhould point the thunder of his eloquence on a quaker-meeting. The thundering ſort of eloquence would here be miſ-applied, and how many ſoever he might uſe of thoſe conciliating qualities of ſpeech, which Leland ſpeaks of, he would ſtill be unſucceſsful, becauſe his ſpeech would not be *ad homines*. Dr. Leland's remarks are truly ſenſible, and would not be liable to objection, if altered but a little. The addition to be recommended, is a ſhort explanation of what he means by thoſe rational and real excellencies, thoſe conciliating qualities of ſpeech, which he repeats, as the baſis of his reaſoning. Had he been called upon for ſuch an explanation, he would, I am perſuaded, have expreſſed himſelf ſo, as to deviate materially from the truth of the caſe. He would probably have ſaid, that Nature had at firſt ſuggeſted certain forms of ſpeech, which rhetoricians had arranged and ſettled, and that theſe he meant to deſcribe by the terms, rational and real excellencies, engaging and conciliating qualities. This others *have* ſaid, and to ſuch let it be anſwered, that perhaps the moſt common faults of all bad writing ariſe from this ſuppoſition, of ſomething intrinſically excellent and eloquent in certain forms of ſpeech, even when conſidered without any view to the effects they are fitted to produce.

Moſt writers, it muſt be confeſſed, employ tropes and figures becauſe they *are* tropes and figures, and not becauſe they are calculated to produce certain effects on the minds of their readers or hearers. The term conciliating is itſelf relative, and ſuppoſes ſomebody to be conciliated; and theſe conciliating qualities of ſpeech muſt vary, as much as the tempers and underſtandings of thoſe who are to be conciliated. That which is a conciliatory quality in a methodiſt congregation is not ſo in parliament, and that which is ſo in parliament, is not ſo in a quaker-meeting.

The grimaces and rueful exclamations, which Leland ſuppoſes are ſo effectual in a conventicle, are certainly more uſeful than even his conciliating qualities and rational excellencies of ſpeech; but it is alſo true, that exclamations more pathetic, and geſtures more natural, would be ſtill more effectual, even in an aſſembly of enthuſiaſts; and the tears and groans produced by theſe grimaces only ſhew the great advantage of appropriating and adapting both ſtyle and geſture, ſince he himſelf allows, that theſe awkward attempts at ſpeciality and adaptation, have more effect than the moſt polite and ſplendid oration, if compoſed and delivered without any regard to the peculiarities of the audience. Yet although the variety of temper, intelligence, cuſtoms, opinions and prejudices, among mankind, is very great

great, there are at bottom certain leading principles, certain maſter-paſſions and prevailing prejudices that all men have in common, which form the character of the ſpecies, and greatly overbalance all accidental and acquired differences. Variety of character is undoubtedly one of the characteriſtics of man, but ſimilarity is a more important one. We all both reſemble and differ from each other, in countenance and form, as well as in the turn and quality of our minds. Juſt ſo it is in the art of eloquence; the kinds are as various as the kinds of men, and yet all ariſe from a few fixed and invariable principles, and no other forms of ſpeech can deſerve the names which Leland has given them, but ſuch as are addreſſed to thoſe qualities in human nature, which every perfect individual of the ſpecies is found to poſſeſs. Such qualities there undoubtedly are, and ſo far as we are all alike, ſo far are the rules of eloquence invariable, ſo far muſt a ſpeaker's addreſſes to our underſtandings and tempers, be in all caſes the ſame. In what ſituation, or at what ſeaſon, would it be wrong that the ſtyle ſhould be proportioned to the ſubject, ſhould be perſpicuous in explanation, accurate in reaſoning, decorated in giving delight, or animated in exciting paſſion? That the opening of a ſpeech ſhould not betray inſolence or conceit; that the narration

ſhould be intelligible; that the arguments ſhould be cogent; that the arrangement ſhould be advantageous; that the expreſſion ſhould be ſuitable; that the pronunciation ſhould be varied and diſtinct; theſe are not the precepts of one age or one country: they are as neceſſary to be obſerved at this time, as they were when Ariſtotle or Quintilian firſt inculcated them.

Inſtead, therefore, of concluding with Dr. Browne, that eloquence is of a vague, unſteady nature, or with Leland, that the enthuſiaſt would fail becauſe he is no orator, let theſe inferences be drawn; that eloquence is fixed on ſteady and unchangeable principles; that it is exceedingly extenſive in its uſe, and relates to every kind of diſcourſe or ſpeech that can be imagined: that he who follows its precepts in one inſtance, is in that inſtance truly eloquent, however he may fail of ſucceſs, when attempting another kind of ſpeaking, whether it be of a higher or lower degree; and, in ſhort, let Dr. Campbell's definition be thought the true one, when he ſays, that "Eloquence is the art by which a diſcourſe is adapted to its end." This definition ſolves all difficulties, explains, and, as it were, embodies all rules, and is the grand axiom, by which the propriety of every ſubordinate rhetorical precept muſt finally be tried. If ſuch concluſions can be ſatisfactorily drawn from the foregoing thoughts,

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the examination of the ſubject has not been uſeleſs. For it is plainly of material conſequence, to be right in the firſt principles of a practical queſtion, ſince real conduct in life and buſineſs cannot but be greatly affected by their truth or falſehood. He who thinks eloquence to be the art of deceiving, with Mr. Locke, will, if he be a good man, never ſtudy to be eloquent. He who thinks it is ſpeaking ornamentally, will be ſpeaking ornamentally, when ſpeaking plainly would have been more efficacious. He will, moſt probably, be laviſh of his tropes and figures, when theſe ambitious decorations ſhould have been ſhunned, or employed with the moſt ſparing caution. He who thinks it conſiſts in moving the paſſions, will often be weeping unaccompanied by the tears of his audience: and he who thinks it is the art of perſuading, will not unfrequently be urgent when he ought to be inſtructive, or uſing vehement entreaties inſtead of powerful proofs. He, and he only, will not be cramped in the exerciſe of his art by the narrowneſs of his principles, who thinks it is the art of ſpeaking and writing, in ſuch a manner as is moſt likely to obtain the ends which he propoſes to himſelf in ſpeaking or writing. Does he addreſs the multitude? He will aim at being perſpicuous, intelligible and impaſſioned. Does he ſpeak before men of learning, and ſuch as are

eloquent themſelves? He will endeavour to be unaffected, rational and conciſe. Does he deſire to convince? He will reaſon. Does he wiſh to give delight? He will be copious, flowing, rich in imagery, and elegant in expreſſion: nothing will be harſh, nothing careleſs; nothing unpoliſhed or repulſive. Does he mean to agitate or perſuade? He will be warm, animated and glowing. He will arm himſelf with the thunders and lightnings of eloquence; or will ſpeak in the mild, inſinuating tone of gentle inſinuation; with "bated breath and whiſpering humbleneſs." In ſhort, he will at all times accommodate himſelf to his ſituation; he will be

Orpheus in ſilvis, inter delphinas Arion.

Yet this is not all his praiſe, for it is not only on public and ſolemn occaſions that he will find opportunities to uſe his manifold ſkill*—his eloquence is not only fitted for the bar, the pulpit, or the public aſſemblies of the ſtate, but for the numberleſs intereſting occurrences of private life, and may even deſcend to the narration of events, the compoſition of a letter, or the dexterous management of common converſation.

* Is orator erit, mea ſententia, hoc tam gravi dignus nomine, qui *quæcumque res inciderit*, prudenter, et compoſité, ornaté, et memoriter dicat. Cic. de Or. lib. I. ſect. 15.

To

To men who have lived in the world, and ſeen real affairs, the utility of ſuch a varied, accommodating and ready ſkill, cannot but be obviouſly apparent. It is thus ſpoken of by Lord Bacon, and is ſet down by him among the deſiderata.

"Surely it will not be amiſs to recommend "this whereof we now ſpeak, to a new inquiry, "to call it by name, The Wiſdom of private "Speech, and to refer it to deficients; a thing "certainly which the more ſeriouſly a man ſhall "think of, the more highly he ſhall value"*. But ſetting aſide the evident advantages ariſing from a ſuperior ability in delivering one's ſentiments on great occaſions, and even omitting to lay any ſtreſs on the obvious utility of the ſame ſkill when exerted in a man's private affairs; the pleaſures that ariſe from fine writing are ſo great, ſo various, ſo often to be communicated, and ſo eaſy to be obtained, that this conſideration alone would defend the art from the imputation of inſignificance. For I can never be

* Certe, non abs re fuerit, circa hoc ipſum, de quo nunc dicimus, novam inſtituere inquiſitionem, eamque nomine Prudentiæ ſermonis privati indigitare; atque inter deſiderata reponere: rem certe, quam quo attentius quis recogitet, eo pluris faciet. De Augm. Scient. lib. VI. cap. 3.

brought to believe that they are unprofitably employed, who are conſtantly increaſing the daily pleaſures of their fellow creatures; who can contrive, without corrupting men's minds, to divert and entertain them. Shall thoſe be called unprofitable labours, which deliver a private man from the influence of his domeſtic anxieties; an artizan from the effects of his labour; a ſoldier from his ſufferings; a ſtateſman from his cares: which enable one man to forget his poverty, another his diſeaſe, a third his captivity, and all, their misfortunes?

Who are theſe ſevere judges that are ever inſiſting upon the excluſive excellence of the mechanical, commercial, or even philoſophical employments? as if thoſe employments were good for any thing, conſidered ſeparately from the end which they aim at in common with works of imagination, THE PROMOTION OF HAPPINESS. Are there any of them that tend more immediately to this great purpoſe? Which of them has more power to refine the manners, to ſoften the temper, to diffuſe tranquility and cheerfulneſs; to correct and enlarge the mind? Away then with ſuch ſhort-ſighted objections, and let thoſe that chuſe it prefer the man who makes a blade of graſs grow where it grew not before, to the poet and the moraliſt, who water the ſickly ſeeds of virtue,

and

and cauſe a rich harveſt of good deeds to ſpring up, from the barren and unfriendly ſoil of a depraved or neglected heart.

Not far beneath the hero's feet,
Nor from the legiſlator's ſeat,
Stands far remote the bard.
Though not with public terrors crown'd,
Yet wider ſhall his rule be found;
More laſting his award.
Lycurgus faſhioned Sparta's fame,
And Pompey to the Roman name,
Gave univerſal ſway:
Where are they?—Homer's reverend page
Holds empire to the thirtieth age,
And tongues and climes obey.

AKENSIDE on the Uſe of Poetry.

TO

TO THE REV. DR. BARNES.

SIR,

I BEG your acceptance of the following paper; and if you think that it deſerves the attention of your Philoſophical Society at Mancheſter, I take the liberty of requeſting you to preſent it to that learned body. I have the honour to be,

SIR,

Your moſt obedient humble Servant,

TURNHAM GREEN,
MIDDLESEX, *Dec.* 1. 1787. JOHN ROTHERAM.

Some PROPERTIES *of* GEOMETRICAL SERIES *explained in the* SOLUTION *of a* PROBLEM, *which hath been thought indeterminate. By* JOHN ROTHERAM, M. D.

PROBLEM.

Given, the ſum *(a)*, and the ſum of the ſquares *(b)*, of any Geometrical Series: to determine the Series.

SINCE every Geometrical Series, as, $x\ xr\ xr^2\ xr^3$ ..... to xr^{n-1} is univerſally expreſſed by three quantities, viz. x, the firſt term, r, the

r, the common ratio, and n, the number of terms; and since there are only two conditions, given by the problem, whence these three quantities are to be found, it hath hitherto been thought indeterminate, or one that would admit infinitely many answers.

In an infinite geometrical series, whose sum, $x+xr+xr^2+xr^3$, &c. ad infinitum $=a$, is a finite quantity, it is evident that r, the common ratio, must be less than unity: but it may be either a positive or a negative quantity. If it be a positive quantity, then it must be a proper fraction; but if negative, it may be either a proper fraction, or an improper fraction, or a whole number. If r be positive, the series will be, $x+xr+xr^2+xr^3$, &c. ad infinitum; but if negative, it will be $x-xr+xr^2-xr^3$, &c. ad infinitum. I shall first solve the general case where $x+xr+xr^2+xr^3$, &c. ad infinit. $=a$, and $x^2+x^2r^2+x^2r^6+x^2r^8$, &c. ad infinit. $=b$.

If the first of these equations be multiplied by r, it will be $xr+xr^2+xr^3+xr^4$, &c. ad inf. $=ar$; and this, taken from the first, leaves $x=a-ar$.

If the second equation be multiplied by r^2, it will be $x^2r^2+x^2r^4+x^2r^6$, &c. ad inf. $=br$, and this, taken from $x^2+x^2r^2+x^2r^4$, &c. ad inf. $=b$, leaves $x^2=b-br^2$.

But

But $x=a-ar$, whence $x^2=a^2-2a^2r+a^2r^2$; and consequently, $b-br^2=a^2-2a^2r+a^2r^2$. Whence, after proper reduction, $r=\frac{a^2-b}{a^2+b}$.

This value of r being substituted in the equation $x=a-ar$, gives, after proper reduction, $x=\frac{2ab}{a^2+b}$. Whence, x and r being found, the series will be known.

Example. Let $a=24$, and $b=192$; then $r=\frac{a^2-b}{a^2+b}=\frac{576-192}{576+192}=\frac{384}{768}=\frac{1}{2}$; and $x=\frac{2ab}{a^2+b}=\frac{24\times192\times2}{768}=12$; and the series is 12, 6, 3, $1\frac{1}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$, &c. ad inf.

Again. Let $a=243$, and $b=29524\frac{1}{4}$; then $r=\frac{1}{3}$, and $x=162$; and the series will be 162, 54, 18, 6, 2, $\frac{2}{3}$, $\frac{2}{9}$, $\frac{2}{27}$, &c. ad infinitum.

In the infinite series $x+xr+xr^2+xr^3$, &c, inf. $=a$, $a=\frac{x}{1-r}$, because, $x=a-ar$, as above. By a similar deduction, $b=\frac{x^2}{1-r^2}$. For the same reason, if xr^n be the first term of an infinite series (n being any positive whole number) then, $a=\frac{xr^n}{1-r}$, and $b=\frac{x^2r^{2n}}{1-r^2}$.

The finite series $x+xr+xr^2+xr^3+\ldots$ to xr^{n-1} is the difference of two infinite series, of which x is the first term of the greater, and xr^n of the less series, and consequently the sum of the

the finite series will be $\frac{x}{1-r} - \frac{xr^n}{1-r}$ or $\frac{x-xr^n}{1-r}$; and the sum of the squares will be $\frac{x^2}{1-r^2} - \frac{x^2r^{2n}}{1-r^2}$ or $\frac{x^2-x^2r^{2n}}{1-r^2}$: *i. e.* $a = \frac{x-xr^n}{1-r}$, and $b = \frac{x^2-x^2r^{2n}}{1-r^2}$; and if x be taken for the least term, and xr^n for the greatest, in which case r will be greater than unity, then $\frac{xr^n-x}{r-1} = a$, and $\frac{x^2r^{2n}-x^2}{r^2-1} = b$. From these two equations only, it is impossible to obtain the values of the three unknown quantities, x, r, and n; recourse must therefore be had to another property of the series.

Let there be given $x+xr+xr^2+xr^3$, &c. .... to $xr^{n-1} = a$; and $x^2+x^2r^2+x^2r^4$, &c. .... to $xr^{2n-2} = b$, where x, r, and n are whole positive numbers. Then the latter of these equations divided by the former, gives $x-xr+xr^2-xr^3+xr^4-xr^5$, &c. $= \frac{b}{a}$. If this be added to the first equation, the sum will be, $2x+2xr^2+2xr^4$, &c. $= a+\frac{b}{a}$; and, if it be subtracted, the difference will be, $2xr+2xr^3+2xr^5$, &c. $= a-\frac{b}{a}$. Again, let $2x+2xr^2+2xr^4+2xr^6$, &c. $= a+\frac{b}{a}$ be divided by $2xr+2xr^3+2xr^5$, &c. $= a-\frac{b}{a}$, the quotient will give r, and the remainder

mainder $2x$; as will appear by the operation;

$2xr+2xr^3+2xr^5$, &c.) $2x+2xr^2+2xr^4+2xr^6$, &c. (r, in the quotient

$2x$ * * * the remainder.

Hence this general Rule. Divide the sum of the squares by the sum of the series. Add the quotient to, and subtract it from, the sum of the series. Divide the greater of these two numbers by the less; the quotient of this second division shall be the common ratio, and the remainder twice the first term.

Example I. Let $a=242$, and $b=29524$. Then $\frac{b}{a}=122$, and $242+122=364$, and $242-122=120$; and 364 divided by 120, gives 3 in the quotient, for the common ratio, and 4 in the remainder, the half of which, 2, for the first term of the series. And, these being known, the number of terms will be found by the common rules. Whence the series is 2, 6, 18, 54, 162.

Example II. Let $a=68887$ and $b=2372950489$; then $\frac{b}{a}=34447$, and $a+\frac{b}{a}=103334$, which divided by $a-\frac{b}{a}=34440$, gives, in the quotient, 3 for the common ratio, and in the remainder 14, the half of which, 7, for the first term; whence the series is 7, 21, 63, 189, &c. to 9 places.

Example

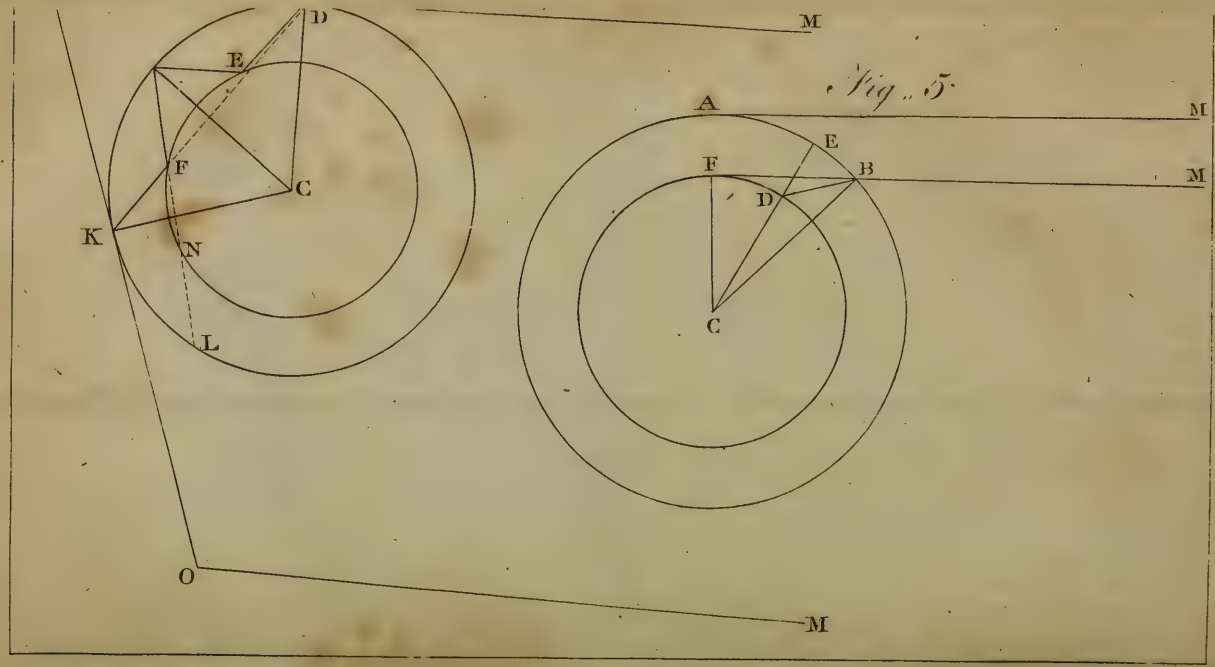
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Fig. 5.
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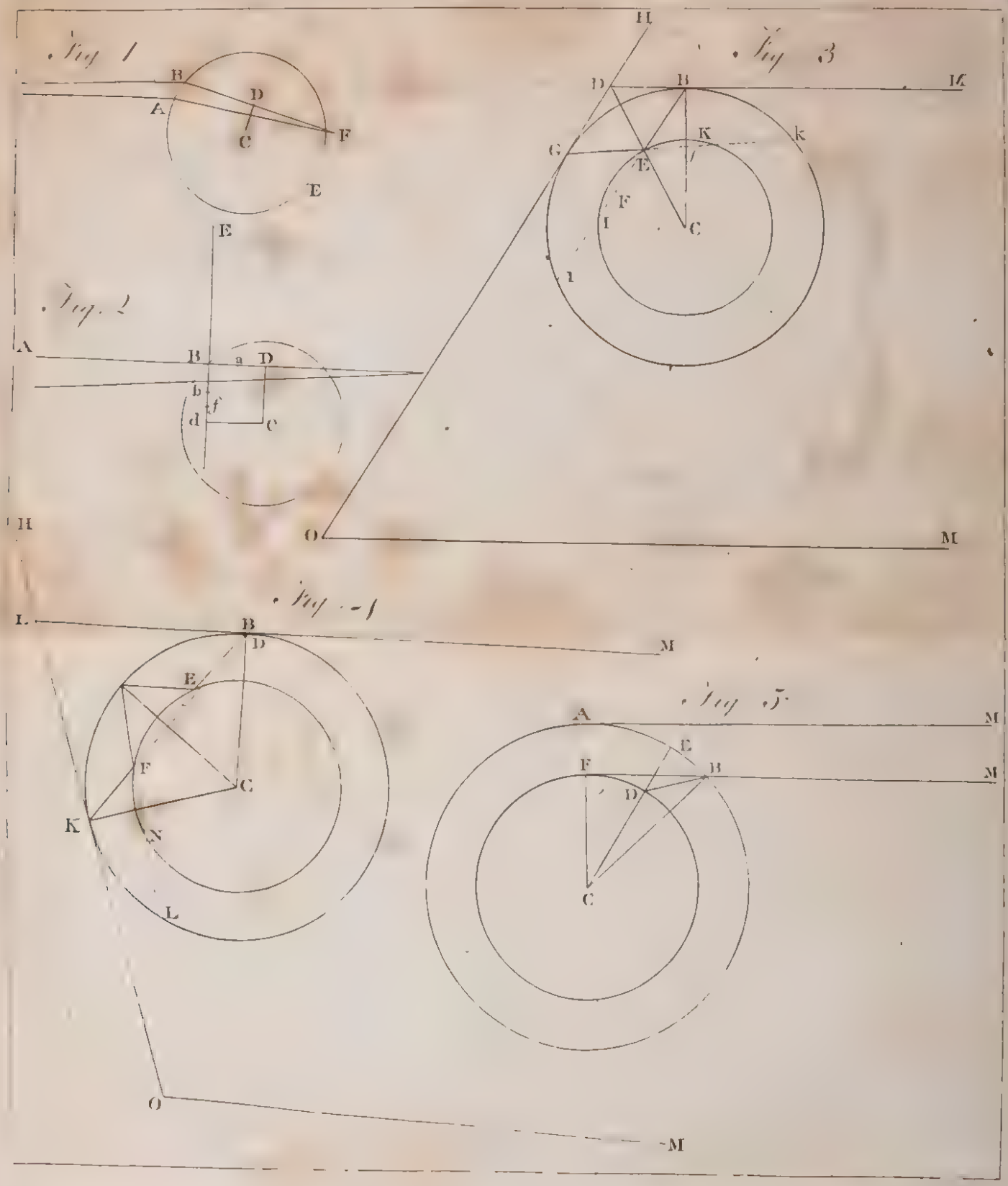
Fig 1
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Fig 4
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Fig 5
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EXAMPLE III. Let $a=1820$, and $b=1660750$; then $\frac{b}{a}=912\frac{1}{2}$, and $a+\frac{b}{a}=2732\frac{1}{2}$, and $a-\frac{b}{a}=907\frac{1}{2}$, and $2732\frac{1}{2}$ divided by $907\frac{1}{2}$ gives 3 in the quotient, and 10 in the remainder, thus

$$907\tfrac{1}{2})\,2732\tfrac{1}{2}(3$$
$$2722\tfrac{1}{2}$$
$$10$$

so that 3 is the common ratio, and 5 the first term; and the series is 5, 15, 45, 135, 405, 1215.

EXAMPLE IV. Let $a=75$, $b=2125$; then $\frac{b}{a}=28\frac{1}{3}$ and $a+\frac{b}{a}=103\frac{1}{3}$ divided by $a-\frac{b}{a}=46\frac{2}{3}$, gives 2 in the quotient, and 10 in the remainder; so that the series is 5, 10, 20, 40.

It remains that something be said of the series $x-xr+xr^2-xr^3$, &c. ad infinit. Here r is negative; and since $\frac{x}{1-r}=$ the sum of the series $x+xr+xr^2+xr^3$, &c. ad infinit. consequently, by changing the sign of the quantity r, i. e. by writing $\frac{x}{1+r}$ instead of $\frac{x}{1-r}$ the sum of the series $x-xr+xr^2-xr^3$, &c. ad inf. will be $\frac{x}{1+r}$

If in this series $r=1$, then the series is $x-x+x-x+x$, &c. ad infinitum, and its sum $=\frac{x}{1+1}=\frac{x}{2}$.

I have

I have added this laſt ſeries, $x-x+x-x$, &c. becauſe it has lately been the ſubject of much debate, and I have determined its ſum by a different method to others. Mr. Vince is right in calling the ſum of this ſeries $\frac{x}{2}$, though the method by which he made his deduction was falſe, and which gave his opponents the opportunity of ſaying, that the ſum of the ſeries might have been $\frac{x}{3}$, $\frac{x}{4}$ or $\frac{x}{\textit{any thing}}$ as well as $\frac{x}{2}$.

On Halos, *by the Rev.* James Wood, A. M. *Fellow of St. John's College, Cambridge. Communicated by Thomas Percival,* M.D. F.R.S. *&c.*

READ OCTOBER 12, 1787.

DIFFERENT hypotheſes have been made uſe of by Des Cartes, Huygens and Newton, to account for the appearance of Halos, or coloured circles, round the ſun and moon. The firſt of theſe ſuppoſes rays of light to be refracted by pieces of ice formed like double convex lenſes, which however, he confeſſes, we never find upon the ſurface of the earth. Huygens ſays that halos are cauſed by ſmall globules of ſnow, ſurrounded each by a ſhell of water; the

rays

rays which fall upon the ſnow being ſtopped, whilſt thoſe which fall on the water are refracted into their reſpective colours. Newton accounts for the appearance, by ſuppoſing that rays of light, in paſſing through globules of water, are ſometimes in a diſpoſition to be reflected, and ſometimes to be refracted. All theſe ſuppoſitions however ſeem to be unſatisfactory, as the rays will not fall upon the eye in ſufficiently ſtrong pencils.

The order of the colours in theſe crowns, as laid down by Des Cartes and Huygens, is contrary to that which Sir Iſaac Newton gives.

If they judged from ſuch as are commonly ſeen round the moon, they might eaſily be deceived, as the colours are in general not very diſtinct: the halos I have obſerved have uniformly been ſimilar to thoſe deſcribed by Newton, at the end of his ſecond book of optics.

Cambridge, Nov. 30, 1786. Three very brilliant halos appeared round the moon: the order of the colours, beginning from the moon, was, white of conſiderable breadth, yellow, orange, red; violet, green, yellowiſh, red; violet, green, yellowiſh, red. The red of a fourth was ſo faint as to be ſcarcely viſible. The radii of theſe rings might be about one, two, and three degrees, but they were not meaſured. The red and violet in each caſe ſeemed contiguous.

Dec. 2d. A ſingle halo appeared round the moon; its diameter was about $2\frac{1}{2}^{\circ}$, and the

colours, as in the firſt of thoſe mentioned above; the red of a ſecond was juſt ſeen, and its diameter, as far as could be determined by the naked eye, was double the diameter of the firſt. In attempting to account for theſe appearances it will be neceſſary to lay down the following Lemmas.

LEM. I. A ray of red light cannot paſs out of water into air if the ang. of incidence exceed $48^\circ\ 35'\ 26''$. Nor a violet ray, if that ang. exceed $47^\circ\ 59'\ 53''$.

LEM. II. If a ſmall pencil of parallel rays fall upon a ſpherule of water ABE (fig. 1.) and CD be drawn perpendicular to the refracted rays, they will converge to a point F, which is found by taking FB : FD :: tang. of incid. : tang. of refraction.

Cor. 1. Let the angle of incidence approximate to a right angle, and the tangent of incid. will ultimately be indefinitely greater than the tangent of refraction, and conſequently F will coincide with D.

Cor. 2. If a ſmall pencil of rays diverging from D be incident the contrary way, they will be refracted parallel.

LEM. III. Let a ſmall pencil of rays fall upon the convex ſpherical reflector BFG (fig. 2.) converging to F; from C its centre draw CD perpendicular to BF, and CD to B*f* the direction of the reflected ray produced back; biſect BD, B*d* in *a* and *b*, and take F*a* : *a*B :: B*b* : *bf*: the rays after reflection will diverge from *f*.

Cor.

Cor. 1. If the rays converge to D they will, after reflection, diverge from *f*.

Cor. 2. In the same manner, if the rays diverge from D upon the concave side of the reflector, they will after reflection converge to *d*.

For the truth of these lemmas vid. Smith's Optics, book II. ch. 9.

Let us suppose now with Dr. Halley that vapour consists of hollow spherules of water, filled with an elastic fluid; and let BG*i* (fig. 3.) represent such a shell. Take C its centre, and suppose MB to be a small pencil of parallel homogeneal rays, whose angle of incid. is nearly 90°; they will be refracted to F the middle point of the chord B*i* or EI, (Lem. II. Cor. 1.) and since the ang. BED is greater than EBC, or 48° 36*l*, they fall at E upon a convex spherical reflector converging to the middle of the chord EI; making then the ang. DEG = to the angle DEB they will after reflection diverge from *f*, the middle point of EK or G*k* (Lem. III. Cor. 1.) they will therefore be refracted at G in the direction of the tang. GO, and parallel to each other; and if an eye be placed any where in GO, they will excite the idea of their proper colour. From O draw OM parallel to BM, and suppose the whole figure to revolve round OM as an axis, all the particles which touch the surface described by OG will refract to the eye a small pencil of parallel rays of the same colour.

The apparent ſemidiameter of this ring is meaſured by the angle GOM or HDB = to the angle BCG or 2 the angle BCE ; and if the radii CB, CE, remain the ſame, the greater the angle EBC the greater will be the angle BCE; and therefore the greater the ſemidiameter of the ring; conſequently, the red rays will be refracted to the eye from the outermoſt drops, and the violet from the innermoſt, and rays of an intermediate degree of refrangibility from the intermediate ones.

The rays which do not paſs out of the water at G (fig. 4.) will be reflected converging to the middle of the chord GL or IN (Lem. III. Cor. 2.) and as before, will be reflected at I, diverging from the middle of the chord I*p* or KP, and thoſe which paſs out at K will be refracted in the direction of the tang. KO, parallel to each other. Thus a ſecond ring may be formed, and becauſe the angle BCK is double of the angle BCG, the apparent ſemidiameter of this ring will be double that of the former, which being true of every other ring of a given colour, the order of the colours in the ſecond halo muſt be the ſame as in the firſt. In the ſame manner may a third and fourth be formed at equal diſtances from the preceding ones, in which the order of the colours will be the ſame, but the brightneſs leſs.

Having given the proportion of the radii CB, CE (fig. 3.) the diameter of the halo may be found:

found : Rad. : S. of the angle CBE :: S. of incid. : S. of refraction; and CE : CB :: S. of the angle CBE : S. of the angle BEC, and the angles CBE, CEB being known, the angle BCE is known, which measures $\frac{1}{2}$ of the diameter. And the converse.

The greatest halo will be formed when BE touches the interior surface EI: in this case the angle at E is a right angle; therefore the angle BCE = 90° — 48° 36′ = 41° 24′, and the apparent semidiameter 82° 48′. Also CB : CE :: rad : S. of the angle CBE :: S. of the angle incid. : S. of the angle of refraction.

If we calculate the angle BCE for the red and violet rays, and to twice the difference of these angles add the moon's apparent diameter, we get the breadth of the halo.

Ex. If we suppose the radius of the halo to its outermost edge 1°, CE : CB :: $\frac{81 \times \text{rad.}}{108}$: S. of the angle BED :: 75 : 75.57086 :: 131 : 132 nearly, and the angle BCE for the violet rays will be about 29′ 10″; consequently, the breadth of the colours will be 1′ 40″ + apparent diameter of the moon. Hence it appears that the rad. of the first halo, mentioned above, could not much exceed 30′ if there were no interval between the red and succeeding violet.

If from the same point in the luminous body M (fig. 5.) tangents, MA, MF, be drawn to the surfaces AB, FD, all the rays which fall be-

tween MA and MF will be reflected by the surface FD; for, rad. : S of the angle CBF : : CB : CF : : CB : CD (BD being the direction of MB after refraction) : : S. of the angle CDB : S. of the angle CBD : : S. of the angle EDB : S. of the angle CBD : : S. of the angle CBF $= \frac{\text{rad.} \times \text{S. of the angle CBD}}{\text{S. of the angle EDB}}$ but S. of the angle CBF : S. of the angle CBD : : S. of incid. : S. of refract. hence $\frac{\text{rad.} \times \text{S. of the angle CBD}}{\text{S. of the angle EDB}}$: S. of the angle CBD : : S. of incid. : S. of refract. or rad. : S. of the angle EDB : : S. of incid. : S. of refract. Consequently, the angle EDB is the least angle of incidence on the second surface that the rays can have, and be reflected.

These rays will be emergent in different directions, and the nearer they are to MB (fig. 3.) the less will be the inclination of those in the same pencil to each other and to GO. Hence it appears that the less refrangible rays will be nearly parallel to the more refrangible effectual rays which come from the same drop, and by a mixture of the different colours, may be produced the whiteness in the interior part of the first halo. These rays will be too much dispersed to produce any effect in the second and third.

It may easily be conceived, from the manner in which Sir Isaac Newton has expressed himself, that had the diameters of the halos he mentions been

been accurately meaſured, they would have agreed ſufficiently well with this theory. It is not however conſidered as free from objections, but by future obſervations muſt its truth or fallacy be aſcertained: ſhould it be found to agree with ſuch obſervations, it may throw ſome light on the doctrine of the aſcent of vapours, a matter hitherto ſo much diſputed.

CONSIDERATIONS *relative to the* NATURE *of* WOOL, SILK, *and* COTTON, *as* OBJECTS *of the* ART *of* DYING; *on the various* PREPARATIONS, *and* MORDANTS, *requiſite for theſe different* SUBSTANCES; *and on the* NATURE *and* PROPERTIES *of* COLOURING MATTER. *Together with ſome* OBSERVATIONS *on the* THEORY *of* DYING *in general, and particularly the* TURKEY RED; *by* THOMAS HENRY, F.R.S. *and of the Amer. Philoſ. Society, held at Philadelphia.*

PART FIRST.

READ DECEMBER 20, 1786.

IN the following Memoir, on a ſubject to which too little attention has been directed by Engliſh writers, my principal intention is to preſent, at one view, the preparatory and other

proceſſes for the dying of wool, ſilk, and cotton, and to endeavour to deduce a theory better ſuited to account for the reſults, than has hitherto been advanced. In the execution of this undertaking it will be neceſſary to repeat ſeveral things from Hellot, Macquer, and d'Apligny, who have written ſeparate treatiſes on the dying of theſe materials; and I am to confeſs great obligations to that very celebrated chemiſt M. Berthollet, whoſe reſearches are, every day, affording new and important information in the ſeveral departments of the hermetic art.

The art of dying, or of imparting to different materials, employed for the fabrication of garments and furniture, thoſe beautiful colours which are afforded by many articles of the vegetable, animal, and mineral kingdoms, appears to have been of high antiquity*. As moſt of theſe materials are, of themſelves, either of dark and diſagreeable colours, or elſe devoid of all colour, it is probable, that, even in the very earlieſt ages, the love of ornament, which is natural to mankind, would induce them to ſtain their veſtments with various colouring ingredients, eſpecially with vegetable juices. But the art of imparting *permanent* dyes to cloth, and affixing to its fibres ſuch colouring materials, as could not eaſily be waſhed out by water, or obliterated

* Delaval on Light and Colours.

or

or greatly changed by the action of air, or of certain saline substances, to which they are liable to be exposed, and which are necessary to render them clean, when soiled;—this was an art which required the knowledge of principles not within the reach of untutored men, and only to be obtained by gradual investigation, and in long process of time.

It has been proved by our ingenious associate, Mr Delaval, that the Egyptians were possessed of the art of dying, and even of that of printing on cloths. In a passage, which he has quoted from Pliny, that author relates that the Egyptians having besmeared, or drawn on white cloth, with various substances, which were in themselves colourless, but capable of absorbing colouring matter, threw them into a caldron of hot liquor, tinged with dying materials; and that, though the parts, thus drawn upon, were not distinguishable, before the cloth was immersed in the colouring liquor, and though this liquor contained only *one* colour, it was surprizing to see the cloth taken out, stained with several different colours, according as the different parts of it had been impregnated with the various substances, capable of receiving and altering the nature of the pigment.

This is so plain a description of the art of what is now called callico printing, that though it is my intention to refer those gentlemen, who wish to be more intimately acquainted with the ancient history

hiſtory of dying, to that written by Mr. Delaval, and prefixed to his ingenious treatiſe on light and colours, yet I could not refrain from relating it on this occaſion.

Permit me alſo to mention another hiſtorical fact from the ancient hiſtory of this art. The Phœnicians held a decided pre-eminence in the tinctorian art, for many ages: their purple and ſcarlet cloths were ſought after by every civilized nation, and the city of Tyre, enriched by its commerce, increaſed to an amazing extent. But her career was ſtopped by the vanity and folly of the Eaſtern emperors; under whoſe dominion, this opulent city had unfortunately fallen. Deſirous of monopoliſing the wearing of the beautiful cloths of Tyre, theſe misjudging tyrants iſſued moſt ſevere edicts, prohibiting any one from appearing in the Tyrian blue, purple, or ſcarlet, except themſelves, and their great officers of ſtate. The enacting and enforcing of ſumptuary laws requires great judgment, and delicacy; and much caution ſhould be uſed, leſt, in curbing exceſſive luxury, the arts, which are ſupported by its moderate indulgence, ſhould be deſtroyed. Such however was the fate of the Tyrian dyes. Under the impolitic reſtraint impoſed on the conſumption of the Phœnician cloths, the manufacturers and dyers were no longer able to carry on their trade, it grew languid,

guid, ſickened, and expired: and, with the trade, the art likewiſe periſhed.

This example of the interference of government, ſo materially injuring, and even annihilating an uſeful art, and the commerce depending on it, though carried to an exceſs, never likely to be imitated in theſe days, ſhould make miniſters cautious that they do not form laws which may diſcourage or fetter our manufactures. For freedom is the very ſoul of trade; and, in proportion as the one is invaded, the other will certainly decline.

In this nation, the art of dying had made no conſiderable progreſs till about the beginning of the laſt century*. Before that period, our cloths were ſent to Holland, to be dreſſed and dyed. Probably however this was practiſed only in the caſe of particular colours; for it appears that the dyers of London received their charter of incorporation from Henry the ſixth. My friend Mr. Charles Taylor has put into my hands a ſmall tract, entitled, *A profitable book declaring dyvers approved remedies, to take out ſpots and ſtaines, in ſilkes, velvets, linen, and woollen clothes. With divers colours how to die velvets and ſilkes, linen and woollen fuſtian and threade. Alſo to dreſs leather and to colour felles &c. &c. very neceſſarie for all men, eſpecially for thoſe who hath or ſhall have any doings*

* Chamber's Cyclopædia, article Dying.

therein:

therein: with a perfect table thereto, to find all things ready, not the like reveled in Engliſh heretofore. Taken out of Dutche, and Engliſhed by L. M. imprinted at London by Thomas Parfoot, dwelling in the new rents. 1596. This little book, publiſhed at ſo early a period, contains many good proceſſes; and it is to be lamented, that during ſo long a lapſe of time, the Engliſh nation has not produced any work, on this ſubject, that I know of, much ſuperior to it. The mode of computing the length of time, employed in many of the proceſſes contained in this publication is curious. The immerſion of the ſubject in the dying liquor is, in general, ordered to be continued, not for ſo many minutes, but for five, ſix, or ſeven *Pater-noſters* long.

The dying of woollen and ſilken goods has long ſince attained a conſiderable degree of excellence, while the manufactures of cotton, owing to the ſmall attraction of that ſubſtance for colouring matter, have been very deficient in this point. Till within theſe few years, the colours employed in the dying of fuſtians and cotton velvets were few; and, even at this day, many of them are fugitive. But it muſt be allowed that great improvements have been made, within theſe few years; improvements principally owing to the ingenuity and public ſpirit of Mr. Wilſon, of this ſociety; who by the application of chemical principles, and by a diligent inveſtigation

gation of the nature of colouring ſubſtances, laid the foundation on which the preſent fabric is erected.

Much room is however ſtill left for the improvement of the art, and I am convinced that it is only by our practical dyers acquiring chemical knowledge, that it can ever be effected, to any great extent. While men do not underſtand the grounds on which they ſhould proceed, many errors muſt ariſe, many needleſs materials muſt be employed, and much expence, which might be ſpared, muſt be incurred. To promote this deſirable end, I ſhall, with the permiſſion of this Society, lay before them, not only ſuch information, as I have extracted from the beſt writers on the ſubject, but ſuch facts as I have been able to collect, and obſervations which I have had opportunities of making, tending to form a juſt theory of dying; and eſpecially of thoſe proceſſes where mordants are employed.

The variety which obtains in the facility with which animal and vegetable ſubſtances attract colouring matter is a curious ſubject for inveſtigation. It is known that ſome colouring ingredients which are moſt readily imbibed, and tenaciouſly held, by wool, have much leſs effect on ſilk, and are either wholly rejected, or very ſlightly attached to, cotton or linen. Different preparations and mordants, applied under different

ent circumſtances, are requiſite for theſe ſeveral materials. M. du Fay's experiment, which he made before the Royal Academy of Sciences, has been ſo often related, that I ſhall not quote the particulars. Let us rather refer to the theories which have been advanced to account for theſe phenomena; inquire how far they appear to be founded on truth; and give the chemical analyſes of the various ſubſtances, which may perhaps ſerve to throw ſome new light on the ſubject.

Theſe phenomena have been variouſly explained. Some have attributed the variety in the power of the ſeveral ſubſtances to retain the dying ingredients applied to them, to the different ſtructure of their filaments; to the poroſity of wool, and to the impenetrability of cotton and linen*; at leaſt, to the latter poſſeſſing pores of much inferior dimenſions; ſilk being ſuppoſed to hold a middle rank. Wool, ſay theſe theoriſts, is compoſed of numerous filaments, ſimilar to hairs, and like them conſiſting of tubes, containing a medullary or oily matter. The ſides of theſe tubes are alſo perforated with an infinite number of ſmall orifices, communicating with the longitudinal canal. From this mechaniſm, it is excellently adapted for receiving extraneous bodies, which are not only capable of

* Le Pileur d'Apligny Art de la Teinture des fils, & etoffes de Coton.

being

being applied to the superficial pores of the filaments, but even of penetrating into the interior structure of the tubes, when divested of the medulla they naturally contain.

Silk is described, by these writers, as a glutinous liquor, formed in, and excreted from, the body of the silk worm, who spins it into a kind of thread, which hardens on exposure to the air. An operation which is facilitated by another substance, analogous to wax, which the worm also secretes, and with which the surface of the filament is varnished. This thread being formed by a continued series of the dried glutinous particles, in the act of drying many pores must be formed on its surface. But these pores are superficial; and the thread not containing a longitudinal canal, is therefore incapable of admitting any but minutely divided particles, and those in very limited quantities: and as these particles cannot penetrate deeply into the substance of the silk, they require, for their confinement, some addition, which shall more strongly agglutinate them than is necessary for the dying of wool. Hence the difficulty of attaching permanent colours to silk; and hence the greater waste of the dying materials: for as only the finest particles can be admitted into the pores, the remainder is lost.

Cotton is represented as a filamentous substance envelloping the seed of the cotton plant. The

filaments

filaments are ſaid to be tubular, and, like wool, to have exterior lateral pores, communicating with the longitudinal tubes. Theſe are much ſmaller than thoſe of wool, and are filled with an unctuous matter, of which they muſt be deprived, before they can be penetrated by the particles of the dying materials. This matter is difficult of ſolution, and hence, and from the minuteneſs of the tubes, ariſes the labour requiſite to complete the dying of cotton. That it really contains this unctuous ſubſtance is evident, they add, from the ſlow manner in which cotton imbibes water, previous to its being prepared or ſcoured, and from its increaſed power of abſorption, ſubſequent to that operation; by which alſo, though opake before, it is rendered clear and tranſparent.

Linen, in the ſtate of flax, is probably alſo porous; but its pores being ſmaller than thoſe of the other ſubſtances; and being of a more compact texture, they admit, with more difficulty, the tinging particles, eſpecially thoſe of the good dye. The particles of the falſe dye, however, find pretty eaſy admittance. But, when the flax is ſpun, a number of accidental pores are formed in the thread, into which the particles of the greater or true dye may enter, and be better retained than in the flax. And for this reaſon the *twiſted* thread takes a better colour than either the flax, or *ſingle* thread.

If

If we allow of the authenticity of the above facts, they will certainly account, in a satisfactory manner, for the different effects produced, by the same tinging materials, on subjects composed of wool, to those produced on silk, cotton or linen. If they be all porous, and the dimensions of the pores of each be different, the substance, which has the largest pores, will be capable of receiving a much greater portion of tinging matter, than that which has the smallest. It may seem some confirmation of this theory that cloths, woven in various modes, are said to receive colour, more or less freely, according to their texture. But perhaps the various shades, observable in these cases, may proceed from some circumstances, in the reflection and transmission of the rays of light, arising from the alteration in the position of the reflecting and transmitting bodies.

To this theory it has been objected, and with much appearance of reason,* that the colouring matter is not merely insinuated into the pores of the substance to be dyed, but becomes firmly attached to it; and, that the more numerous and large the pores are, the more of the colouring matter should be absorbed, and, as it were hidden, within them; whereas wool, which is supposed to contain pores, more numerous and

* Macquer Dictionaire de Chymie, Edit. 2. Vol. IV.

large than thoſe of ſilk, receives an equally brilliant crimſon, from two parts of cochineal, as is produced by five parts, on ſilk; both ſubjects being prepared in the ſame manner, by aluming. And this, not becauſe the ſilk rejects any of the colouring particles of the cochineal; for the liquor is equally exhauſted of colour, in one caſe as in the other; but, it ſhould ſeem, that ſilk can abſorb much more colouring matter, and yet is much leſs eaſily dyed, than wool. It is therefore more probable that dying is a mere application of colouring matter to the fibres of the materials to be dyed, aided by a chemical attraction between theſe ſubſtances; and that the entrance of the colour into the pores of the cloth, &c. is an ill founded hypotheſis.

But is it not probable, admitting that a different mechaniſm may exiſt in the ſtructure of theſe ſubſtances, that there may, alſo, be a difference in the nature of their conſtituent or proximate principles, which may vary the force of their attraction for the tinging matter, or for thoſe ſubſtances which are uſed as baſes for that matter to adhere to; into the nature of which we ſhall hereafter examine? Neuman analyſed, by fire, wool, ſilk, and cotton; and he found them to conſiſt of proximate principles, differing in each, from thoſe of the others*.

* Neuman's Chemiſtry by Lewis, vol. II.

From

From one pound, avoirdupois, of wool, he obtained by diſtillation, one ounce, ſix drachms of volatile alkaline ſalt, ſeven ounces of nitrous ſpirit, and two ounces and half of empyreumatic oil. The caput mortuum weighed three ounces, ſix drachms, of which two drachms were diſſipated by calcination.

Silk yielded, from a ſimilar weight, nine ounces of mixed matter, conſiſting of four ounces, two drachms of urinous ſpirit; three ounces, ſix drachms of volatile ſalt, and one ounce of empyreumatic oil. The reſiduum weighed ſeven ounces; loſt one ounce on calcination, and then afforded, to water, forty grains of fixed ſaline matter.

Cotton did not yield the ſame fœtid ſmell as wool, when burned in the open air, nor any urinous ſalt or ſpirit in cloſe veſſels. A pound, avoirdupois, of cotton gave over, on diſtillation, ſeven ounces of an acidulous, ſuliginous, oily ſpirit, and about ten drachms of an empyreumatic oil. The remaining coal was reduced, by calcination in a crucible, to eight ſcruples of white aſhes, which afforded a ſmall portion of fixed alkali. Monſieur Berthollet, a very ingenious French chemiſt, has lately analiſed theſe ſubſtances in a different manner.*

On diſtilling ſilk with nitrous acid, he obtained ſaccharine acid, and a greaſy matter; which,

* Journal de Phyſique, vol. XXIX. part II.

though it at firſt congealed on the ſurface of the liquor in the receiver, was afterwards diſſolved in it, by means of heat, even though diluted with water, with which it paſſed through the filter. Wool alſo afforded the ſame greaſy matter, and acid of ſugar; the latter in much larger portion than any other ſubſtance which he treated in the ſame manner. But the oil of vegetable ſubſtances was entirely deſtroyed by this treatment, no greaſy matter being produced; and, on analyſing cotton, he procured ſaccharine acid, but no other product; and the quantity of that acid was far inferior to that yielded by animal ſubſtances.*

It ſhould appear, then, that there is a conſiderable difference between the conſtituent parts of animal and vegetable ſubſtances. Animal

* M. Berthollet found the portion of ſaccharine acid, yielded by cotton to be very ſmall indeed; nor did he find any other reſiduum, in the retort, or any thing but the pure nitrous acid, in the receiver. Almoſt the whole, therefore, of this vegetable matter, ſeems to have been changed from a ſolid, to an aërial form, and to have been diſſipated as gas; a ſtate to which the ſaccharine acid is alſo eaſily reducible. Thus, ſays he, probably, are the moſt ſolid bodies convertible into elaſtic vapours, as on the other hand, the moſt compact ſubſtances in nature may be formed by the union of different gaſes.

The ſaccharine acid was firſt diſcovered by Bergman, in ſugar, but is obtainable from many other ſubſtances both animal and vegetable, which contain its baſis, particularly from galls, which yield it in great abundance.

ſubſtances

ſubſtances contain much more oil than vegetable ones, and this oil is ſoluble in water, which the vegetable oil is not. The animal oil, on diſtillation yields an alkaline; the vegetable, an acid, liquor. On the different properties of theſe oils, the diſtinction between the nature of animal and vegetable ſubſtances ſeems chiefly to depend. It is to be remarked, in the analyſis of wool by M. Berthollet, that though animal ſubſtances yield much volatile alkali on diſtillation, no nitrous ammoniac was formed in his proceſs; which might have been expected, had the alkali been previouſly contained in the wool. This fact favours the opinion that the volatile alkali is formed during the proceſs of diſtillation. It is at leaſt probable that the alkali is ſo combined in animal bodies, as to require the aid of heat to free it from thoſe ſubſtances, which neutraliſe or conceal it. Or, as we know that there is a ſtrong reſemblance between volatile alkali and the inflammable principle, may we not ſuppoſe that this principle may be forced by heat, into combination with the animal acid, and the alkali be, thus, created*? Vegetables yield but

* M. Berthollet has ſince proved the volatile alkali to be formed by the union of inflammable with phlogiſticated gas; and that it does not exiſt in animal ſubſtances, previous to their diſtillation or putrefaction. The effects therefore that have been aſcribed to the ſuppoſed volatile alkali of theſe ſubſtances, in the proceſſes of dying, muſt depend on ſome other cauſe.

little of this volatile alkali, but much acid liquor.

It may be added, that vegetable substances, whose oil is wholly destroyed by nitrous acid, and to whose texture the mineral acids, in general, are highly injurious, bear steeping in solutions of caustic alkali, of such strength, as would prove totally destructive to wool.

How far these varieties, in the component parts of animal and vegetable substances, may influence their power of attracting colouring matter, I do not pretend to determine, but the propriety of a different previous treatment, seems clearly deducible from it.

Wool has naturally so strong an attraction for colouring matter as to need but little preparation, previous to the more immediate processes of dying; and it is only necessary to scour it from a greasy or fatty substance, called the yolk, which is contained in the fleece. For this purpose an alkaline liquor is necessary; but as alkalis injure the texture of the wool, it is requisite that a very dilute solution be employed; for were the quantity of salt greater than is sufficient for converting the yolk into a soap, it would attack the substance of the wool. Putrid urine, therefore, is generally used, as being cheap, and containing a volatile alkaline salt, which, uniting with the greasy matter, renders it soluble into water.*

* Hellot Art de la Teinture des Laines, &c.

Silk,

Silk, when taken from the cone, is covered with a kind of varnish, which makes it feel rough and hard to the touch, tarnishes its whiteness, and is generally said to be of such a nature, as to be neither soluble in water, nor in spirit of wine. It has been thought that the only solvent for this substance is a solution of alkaline salt; and this is commonly applied in the form of soap. The soap should always be of the best quality; for inferior soaps, especially those made with animal fat, are not only less powerful in their action, but apt to stain or discolour the silk. The silk in this operation loses about $\frac{1}{4}$ of its weight. The matter separated from it is highly putrescent; for if a hank of silk which has been thus treated, be not washed, after the operation, it will, in a few days, grow hot, stink, and be covered with small white worms, which feed on the soapy and glutinous matter remaining in the silk. The liquor in which it has been boiled also soon putrifies, and becomes useless. Could this animal matter, says M. Macquer, be precipitated from the soap, before putrefaction takes place, the soap might be recovered, and thus, a considerable saving made to the dyer.*

The use of the best soaps has been recommended; but even these are suspected of being detrimental to the whiteness of the silk; and the Chinese silks, which exceed the European in

* Macquer Art de la Teinture en Soie.

luſtre, are ſaid to be prepared without ſoap. The French Academy, therefore, ſome years ago, offered a prize for the diſcovery of a method of cleaning ſilk, without ſoap; and the prize was obtained by M. Rigaut, whoſe mode was to uſe a ſlender alkaline ſolution inſtead of ſoap.

But Monſ. l'Abbe Cullomb* has lately gone farther, and has actually diſſolved in water, the varniſh of ſilk, which has always been ſuppoſed to be of that oleo-reſinous kind, as not to be acted on even by ſpirit of wine. He expoſed a quantity of raw ſilk to the action of boiling water, for nine hours, and found it freed from the varniſh, with the loſs of one fourth of its weight.

Though the ſilk, by theſe means, acquires a conſiderable degree of whiteneſs; if intended to receive ſome of the moſt brilliant colours, a farther operation is requiſite. This conſiſts in expoſing the ſilk to the fumes of burning ſulphur, ſo confined in a ſtove, that none ſhall eſcape, but the whole be applied to the material intended to be whitened. Of the rationale of this operation Mr. Delaval has given a very ingenious explanation.†

But, though thus rendered more fit for exhibiting the brilliant colours, the attraction of the ſilk, for colouring matter is rather diminiſhed

* Journal de Phyſique, part II. vol. XXIX.

† Mancheſter Memoirs, vol. II. p. 2.

than

than increaſed. The raw or unſcoured ſilk being more eaſily and permanently dyed, than that which has paſſed the above deſcribed proceſs.

Cotton and linen are prepared, for the purpoſes of dying, by boiling in ſolutions of alkaline ſalts, and afterwards expoſing to the air and ſun's rays, in the bleach field. Linen, containing much oily and reſinous matter, requires a ſtrong ſolution of alkaline ſalts, and that they be in a cauſtic ſtate; but cotton, not having any reſinous matter, and not much ſuperabundant oil, the milder alkalis are more beneficially employed for the bleaching of it.*

This bleaching, or ſteeping in the alkaline leys, leaves in the cotton, however well waſhed, ſome earthy matter, which being unequally diſtributed, would, when the cotton is to be dyed, render the application of the colour unequal. This therefore is to be removed by ſteeping in a dilute vitriolic acid, which is capable of diſſolving and carrrying off the earth. But this acid is

* The new mode of bleaching, by means of the dephlogiſticated marine acid, which has been introduced into our manufactures ſince the reading of this paper, promiſes to be of great utility to them, not only by ſhortening the time required for the proceſs, which has been generally extended from one to two months, may now be reduced to a few hours; but by ſending up the goods in a ſtate much better adapted to the ſubſequent proceſſes.

alſo

alſo to be carefully removed by waſhing the cloth in water: otherwiſe, as it becomes dry, the acid, being gradually concentrated by the evaporation of the water, will attack and corrode the cotton.

The intention of theſe previous preparations ſeems to be two fold. The firſt is to free the material, to be dyed, from any extraneous matter, which might, by its want of attraction for water, prevent the abſorption of the colouring liquor. For we find that unbleached ſtuffs do not imbibe water, with near ſo much avidity as thoſe that have been bleached. The ſecond is, that the yarn or cloth may be rendered whiter, and, by reflecting the rays of light, more copiouſly, enable the colouring matter to exhibit more brilliant tints; and, to theſe, a third intention has been added, viz. to enlarge or dilate the pores of the ſubſtance.

But, for ſome particular purpoſes, cotton requires a different and more complex preparation. In the proceſs for dying the Turkey or Adrianople red, it is boiled, and repeatedly ſteeped, in mixtures of mineral alkali, oil, and animal excrement,—and, though theſe operations have been conſidered as only anſwering the above deſcribed purpoſes, I truſt I ſhall be able to make it appear, in the ſequel of this paper, that important additions are thus made to the cotton, whereby its attraction for colouring matter is increaſed.

Having

Having thus considered the natures of the different subjects of dying, and the various preparations necessary for fitting them for the reception of colouring matter, in general. Let us next proceed to some description of the colouring substances which are employed in dying.

These are divided into two classes, viz. those which are themselves possessed of colour; and those, which possessing no colour in themselves, alter the power of the former to transmit the various rays of light; thereby enabling them to exhibit colours different from those which they would naturally exhibit.

When I say that substances do themselves possess colour, I only mean, that they possess the power of transmitting particular rays of light; so as to produce, by the action of these rays on the retina, the idea of certain colours.

Though the primitive colours, into which a ray of light may be divided, are seven; yet the original colours produced by dyers are no more than five, viz. blue, red, yellow, brown and black. From these, perhaps, the two last may be excluded as compounds. All the other shades, of various denominations, are formed by different combinations of these original colours.

The substances which do, themselves, contain colouring matter, and are used in dying, are chiefly of the vegetable, some of the animal, and, in a few instances, of the mineral kingdom.

The

The laſt conſiſt of metallic calces, and chiefly thoſe of iron and copper.

Of the two former*, moſt of their component parts, in which the colouring matter reſides, ſuch as their mucilage, their gum, and the ſalts which they contain, are ſoluble in water; as, by means of theſe ſalts, are alſo their oily parts. To theſe the French writers have given the general name of extractive ſoapy matter. Other conſtituent parts of vegetables are not ſoluble in water, as ſome of their oily, their reſinous, and their earthy parts.

Yet we ſhould be deceived, as M. Macquer juſtly obſerves, if we were to expect to make a perfect ſeparation, by means of water, of the extractive ſoapy matter from the other parts. For, a portion of that matter is defended from the action of the water, by the reſinous and oily ſubſtances; while, on the other hand, theſe are partially diſſolved, being rendered capable of uniting to the water, by means of the mucilaginous parts.

The colouring animal and vegetable drugs of the *materia tinctoria* have been formed by chemiſtry into three diviſions†.

1ſt. Thoſe ſubſtances, which, together with extractive, contain ſome reſinous, and alſo, ſome portion of earthy, matter in their com-

* Macquer Dictionaire de Chymie. † Ibid.

poſition;

position: and the colouring principle, having a strong attraction to the earth, and this to the substance to be dyed, a separation from the water is easily effected, and the colour is capable of being applied, and of adhering, in a durable manner, without the intervention of any medium. Of this tribe are galls, walnut rinds, and the root of the tree, sumach, and alder bark; and these are called root colours, as being the foundation of others.

2dly. Other articles of the *materia tinctoria* consist of such materials, whose parts are either wholly extractive, or, though containing some resinous matter, are capable of being dissolved in water alone; and being deficient in the earthy principle, contained in the articles of the former division, require that an earth be previously introduced into the pores or interstices of the substance, intended to be dyed; to form a basis, to which the colour may adhere. Without this medium the attraction of that substance to the colouring matter would be so weak as either not to be able to separate it from the water; or, if separated, to retain and prevent it being redissolved by the water, when aided by mechanical means, or the addition of certain substances which increase its solvent powers, even in a small degree*.

3dly.

* Many of these colouring bodies, as well as those of the first division, also contain a principle, known by the appellation

3dly, Another claſs conſiſts of principles ſo prevalently reſinous, that we are obliged to promote their ſolution in water, by fermentation or by the addition of ſome ſubſtance, which may act on the rezinous particles. For this purpoſe alkaline ſalts or quicklime are employed; and by their means we extract the colouring matter of ſome bodies, ſuch as indigo, archil, ſafflower and arnatto. Theſe alſo attach themſelves to the cloth, without the intervention of an earthy medium.

But, the degree of fixity is various in the different articles of the *materia tinctoria* belonging to all theſe diviſions. Some of them belong to the leſſer or falſe dye, as it is called, and are liable to be injured, and even deſtroyed, by the action of the ſun's rays, air, water, and alkaline or acid liquors. The ingredients of the good dye, on the contrary, in a great meaſure withſtand the influence of theſe agents.

appellation of the aſtringent principle, which greatly contributes to their fixity, and has much effect in ſeparating the earthy parts of the ſalt employed to afford the above-mentioned baſis. Under this deſcription are comprehended, cochineal, madder, weld, quercetron bark and ſeveral other drugs. But other articles of this diviſion ſeem to be either deficient in this principle, or elſe to poſſeſs it of ſo volatile a nature, that it readily eſcapes, and carries, along with it, the colouring matter, to which it has a cloſe attachment. Of the nature of this principle, we ſhall hereafter give a more particular detail.

The

The former are more eaſily managed, cheaper, and more brilliant; but the latter make amends for their other defects by their ſolidity and permanency.

The colouring matter itſelf is formed, perhaps, in a great meaſure, of the inflammable, [redacted], in ſome caſes, united to the aſtringent, principle. The identity of light and phlogiſton, or, at leaſt, that the one is a modification of the other appears to be pretty clearly proved. Plants, totally excluded from the ſun's light, acquire no colour; and flowers are obſerved, *cæteris paribus*, to poſſeſs the moſt beautiful tints, in thoſe climates where they enjoy the influence of that luminary, the moſt liberally. This matter therefore muſt of itſelf be very fugitive, and as phlogiſtic bodies act on, and diſſolve, each other, very powerfully, we are hence enabled to account for the deſtructive effects of ſolar light, on colour, when applied to the dead fibre, from its diſſolving the phlogiſton, in the ſame manner, according to Mr. Delaval, as ſpirit of wine diſſolves camphor.*

The acids alſo act on, and deſtroy, colouring matter, in proportion to their attraction for phlogiſton. Thus nitrous acid is highly and inſtantaneouſly deſtructive to many colours: but is exceeded, in power, by the dephlogiſticated marine acid. This very active ſubſtance is the ſtrongeſt teſt of all others for the goodneſs of dyes

* Mancheſter Memoirs, vol. II.

dyes; for, thoſe that can withſtand its action, will endure every other hardſhip without injury.

Again, ſome chemiſts have conſidered iron, as the colouring matter of vegetables, as it certainly is, in many inſtances, of minerals. But this theory does not neceſſarily exclude phlogiſton. For it is ſuppoſed that the various colours which plants exhibit, may depend on the various ſtates of *phlogiſtication* in which the iron exiſts. Thus iron, when diſſolved in vitriolic acid, is green. Apply ſuch a degree of heat, as may drive off a part of the remaining inflammable principle, and the acid, it becomes yellow; and, on carrying the proceſs ſtill farther, it deſcends farther to red, and purple. It muſt be allowed that iron enters as a component part into moſt plants: and that its calces are capable of exhibiting great variety of colours. But ſtill it is to phlogiſton or light, that we are to look up as the real cauſe of colour; this being the active, while the martial calces, can, at moſt, be regarded as the paſſive principle.

Since the formation of the antiphlogiſtian theory, indeed, by which the exiſtence of phlogiſton is denied, the various colours of plants have been accounted for, from the different proportions of dephlogiſticated air, they may retain. Plants, when expoſed to the action of the ſun's rays, have their water decompoſed and part with this pure air, yielding it in proportion to the quantity

quantity of light they receive, and which, joining with it, gives it elasticity. But plants, kept in the dark, throw out none of this air, and are white. Those of the same kind, exposed to a weak light, will have some of the air separated, and have a faint degree of colour; and those, which undergo the action of a strong light, will exhibit vivid tints. But though we allow of the dephlogisticated air as producing whiteness, yet we may also acknowledge the effect of phlogiston in producing colour; and, in fact, the antiphlogistians are obliged to admit of inflammable gas as a substitute for it; and, to acknowledge, that this gas, which they suppose to be the other constituent part of water, is the principle of colour*.

The colourless ingredients used in dying consist of alkaline, acid, nitrous, earthy, and metallic, salts, which contribute either to extract the colouring matter, from other substances which contain it; or, by either attenuating or incrassating its particles, to cause the colour to ascend or descend, according to the prismatic range. Thus, acids raise the blue colour of vegetable juices to indigo, violet, red, and yellow, while alkalis reduce the tints, thus raised, to violet, indigo, blue, and, on a farther addition, to green.

* Journal de Physique, tome XXVI. part I.

In the ſubſequent part of this paper, we ſhall proceed to conſider the nature of the ſeveral baſes; endeavour to deduce a theory of dying; and, particularly, to account for the action of the ſubſtances employed in the preparation for the Turkey red, and in the other parts of that proceſs.

PART SECOND.

READ DECEMBER 27, 1786.

IN the former part of this Memoir, it muſt have been evident to the Society, that the proceſſes which have been already deſcribed, are founded on chemical principles; and that a knowledge of chemiſtry muſt, conſequently, be advantageous to thoſe who have the direction of ſuch operations, and ſerve to expedite improvements in them. In thoſe which remain for deſcription, the Hermetic Art, is equally uſeful.—The whole buſineſs of dying, is, indeed, ſo truly a chemical proceſs, or rather a combination of ſeveral chemical proceſſes, that I am convinced the invention, or at leaſt the principal improvements, of the fundamental parts, muſt have proceeded from men ſkilled in chemiſtry. We have ſeen that the Egyptians were even acquainted with the more com-

complicated kind of dying, or *callico printing*, and this knowledge was not confined to them, but was poſſeſſed by other Eaſtern nations. From the Eaſt alſo proceeded, *to us*, Chemiſtry herſelf; and, it is highly probable that the art was of great antiquity in that part of the globe; and had arrived at a degree of perfection, of which we have at preſent, no ſuitable ideas. To have invented the proceſs of printing, in the manner deſcribed by Pliny, the inhabitants of India muſt, probably have known how to prepare alum*, they muſt have been acquainted with the manner of diſſolving lead in the vegetable acid; they muſt, at leaſt, have been acquainted with the component parts of theſe ſalts; and they muſt have had a knowledge of double elective attractions.

In our diviſion of the various colouring ſubſtances, of the animal and vegetable kinds, we took notice that there are ſome, viz. thoſe of the third diviſion, which not having, of themſelves, a ſufficient attraction for the cloth, require to have an earthy ſubſtance applied as an intermedium. The requiſites in this earth are, that it ſhould have a ſtrong attraction for the material to be dyed, and alſo for the colouring

* The factitious ſalt, which is now called alum, was firſt diſcovered in the Eaſtern countries; but when, where, and by what means, is unknown.

Bergman's Eſſays, vol. I. p. 339. E. tranſl.

principle; and, in many cases, that it should possess perfect whiteness, for the purpose of reflecting the rays of light, so as to enable the tinging matter to exhibit its peculiar colour with the greater brilliancy.—If to these properties, be added, that, though soluble in acids, its solubility should not be too easy, and that it should even be capable of forming insoluble compounds with some other substances, which may be occasionally added to it, for that purpose, we have perhaps a complete description of such a basis, or, as it is commonly called, a mordant.

This is a term, that appears to have been first introduced by the French dyers; who, apprehending that the intention of passing the substances which were to be dyed, through certain saline liquors, the nature of which they did not understand, was to corrode something that opposed the entrance of the colouring principle, and to enlarge the pores of the substances, gave to the liquors, the appellation of mordants.—A term which, as conveying a wrong idea, it is to be wished were rejected. I shall therefore take the liberty to change the word MORDANT for BASIS, adding an epithet occasionally, descriptive of the body, from which it is obtained.

The substances principally used to afford the white bases for colouring matter, are alum, and solutions of tin in different acids, but generally in marine acid, or in a mixture of marine and nitrous acid, commonly known by the name of *aqua regia*.

Alum,

Alum, being a cheap ſubſtance, is moſt commonly uſed. It conſiſts of vitriolic acid, pure clay*, or argillaceous earth, and water. According to Bergman, one hundred parts of cryſtaliſed alum contain thirty-eight of vitriolic acid, eighteen of clay, and forty-four of water. The clay is generally ſuperſaturated with acid, which is proved by the phenomena produced on the addition of mild, vegetable, fixed, alkali. On the firſt portions of alkali being added a ſmall portion of the earth precipitates from thoſe parts of the alum with which the alkali comes in contact; and as pure clay has an attraction for aërial acid, the efferveſcence produced is at firſt ſmall; but preſently the remaining free acid, attacking this precipitate, rediſſolves it, an efferveſcence appears, occaſioned by the diſcharge of the aërial acid from the clay. This precipitation, followed by rediſſolution, and a diſcharge of gas, continues, till the acid be perfectly ſaturated; the precipitation then goes on regularly and the earth is no longer diſſolved a new, except the alkali be continued to be added, after the precipitation is fully accompliſhed; nor does any efferveſcence follow, when freſh portions of alkali are added.

Theſe are the appearances when mild, or aerated, vegetable alkali is uſed; but if the pure or cauſtic

* The conſtituent parts of common clay are argillaceous, mixed with ſiliceous earth, in various proportions. Pure argillaceous earth is only obtainable from alum.

alkali be employed, the precipitation takes place more ſlowly; and if the pure alkali continue to be added, after the precipitation is effected, the earth will be rediſſolved.

This earth has a ſtrong attraction for colouring matter; particularly for ſuch as forms the red and yellow colours. Inſomuch, that if a ſolution of alum be poured into water, deeply tinged with madder or weld, the earth will quit its acid to unite with the colouring particles of theſe ſubſtances, and form with them a precipitate or laque; from which it cannot be ſeparated, either by the action of water, or ſpirit of wine, and which is not even totally deſtroyed by that of fire.

Marine ſalt of tin, and that formed by *aqua regia* have, for their baſis, the white earth of that metal, which has alſo a ſtrong attraction for colouring matter, and is, in ſome caſes, preferred to that of alum. When united to the colouring matter of cochineal, it forms a beautiful pigment, well known by the name of carmine. If the addition of theſe ſaline ſubſtances to the coloured liquors, be ſufficiently long continued and under proper circumſtances, the whole of the colouring matter will be precipitated, and the water be left colourleſs*.

Tin is not the only metal which affords baſes for colouring ſubſtances. Lead, biſmuth and zinc alſo afford earths or calces, which attract

* Macquer Dictionaire de Chymie.

colouring

colouring matter; but the two first have defects which render them less eligible. The calx of zinc may perhaps be usefully employed. But should first be thoroughly purified from the iron which it generally contains.

These all form bases for the more brilliant reds and yellows. For the last, the calx of copper is also employed, having a strong attraction for the colouring matter of weld. Salts containing iron furnish a basis, which, with the astringent matter of vegetables, produces a black dye.

When alum is used to supply a basis for the dying of wool, it is the practice to join with it, either crude tartar or its purified crystals, in the proportion of five ounces of alum, to one of tartar. This last substance we know consists of an alkaline vegetable salt, supersaturated with a peculiar acid, which bears its name. The superabundant vitriolic acid of the alum, will decompose a part of the tartar, by attaching itself to the alkali; and thus the quantity of free tartarious acid is increased; which has no properties injurious to the cloth.

In the aluming of silk, no tartar is employed; for the silk, in the previous preparation, being impregnated with alkaline or soapy matter, the superabundant acid will be neutralised by it. In this process, when the tubs have been long used, a very considerable incrustation is formed on their sides; which, the dyers, finding no injury

from, suffer to accumulate. Some of the soap, used for the scouring, adheres to the silk, notwithstanding the washing it undergoes; and the alkali of the soap, uniting with the acid of the alum, some of its earth is precipitated, joins with the detached oil, and forms the incrusting substance; the undecomposed alum and the vitriolated tartar perhaps also, in part, entering into the combination*.

Cotton requires a still different treatment—as the vitriolic acid is injurious to cotton, and it is necessary that the aluminous solutions should be well dried on it, before it be washed; the acid, being concentrated, by the evaporation of the water, would corrode the cotton. It is therefore proper to saturate the superabundant acid, previous to the aluming of the cotton; and for this purpose $\frac{1}{6}$ or $\frac{1}{8}$ of pearl ashes is to be added.

But the aluminous liquor, used by the printers, is prepared in a different manner. To three pounds of alum dissolved in a gallon of hot water, a pound and half of sugar of lead is added; the mixture is stirred together for a considerable time, and the agitation repeated often, during two or three days; when a few ounces of whiting are to be added, gradually, as a strong effervescence ensues. On adding the sugar of lead to the alum, a double elective attraction produces two decompositions, and two new compounds. The vitriolic acid forsakes the

* Macquer, Art de la Teinture de Soie.

the earth of alum to unite with the calx of lead of the *ſaccharum ſaturni*; and this new ſalt, poſſeſſing very little ſolubility, falls to the bottom of the veſſel in form of a white precipitate. The earth of alum, being left at liberty, and in ſo minutely divided a ſtate, is attacked, in the act of precipitation, and diſſolved by the acetous acid; which, having quitted the lead, is ready to form this new union; and thus a very ſoluble ſalt, being the product, it remains diſſolved in the water; and, when thickened with gum, is applied by means of blocks to the cloth. The piece being afterwards dried in a hot ſtove; the vinegar, which as the cloth dries, becomes highly concentrated and very volatile *; not having a ſtrong attachment to the aluminous earth, flies off and leaves the earth, upon the cloth, ready to receive the colouring matter. And herein conſiſts the advantage of the change of the vitriolic for the acetous acid.

Thus we ſee that the printer's liquor, for the red and yellow colours, is not, as thoſe artiſts generally imagine, a mixture of alum and ſugar of lead, but merely an acetated argill, or aluminous earth, combined with vinegar. The addition of whiting is intended only to neutraliſe the

* The vinegar, by its union to the calx of lead, ſeems to have acquired ſome new properties. For on ſeparating it from the lead, by diſtillation, it always contains ſome portion of ether. When the cloth has become dry in the hot ſtove, Mr. Charles Taylor has obſerved flaſhes of electric light, darting from its ſurface.

ſuper-

ſuperabundant acid; and would perhaps be better made to the alum, before the mixture of the ſugar of lead. For as that acid immediately precipitates ſome of the lead, without furniſhing the acetous acid with aluminous earth in return, a waſte of the *ſaccharum ſaturni* is the conſequence, which might be prevented by the mode now recommended.

The ſolutions of tin, and the other white metals, ſhould be as perfectly ſaturated as poſſible; otherwiſe not only the ſuperabundant acid will injure the cloth, but the calx will not ſo readily precipitate, to form the white baſis. In the dying of wool, the ſolution of tin is mixed with the decoction of cochineal, and falls in the form of carmine on the cloth. But ſilk has in vain been attempted to be dyed ſcarlet, in this mode. M. Macquer has however accompliſhed this deſideratum, by firſt fully impregnating the ſilk withthe ſolution, before he proceeded to the dying. By this means M. Macquer declares that he has produced ſcarlet, though not equal to that dyed on wool; yet ſufficiently beautiful, and ſuperior to the ſcarlet formed by a mixture of ſafflower and arnatto. And, he adds, that an eminent manufacturer at Lyons had ſucceeded in dying great variety of colours on ſilk, by applying the tin baſis, after the ſame manner*.

If a ſcarlet could be dyed without the uſe of nitrous acid, the tin baſis might be employed for

* Dictionaire de Chymie, 2d Edit.

this

this purpose, on cotton; but that acid being requisite for the production of this beautiful colour, and being highly corrosive to cotton, this basis is prevented from being applied to that substance. But if this metallic earth has any preference to alum, for other colours on cotton; it might be procured united to acetous acid, by a process, which I have lately discovered, somewhat similar to that for making the printer's liquor; viz. by adding to a solution of tin in marine acid, a solution of sugar of lead. The marine acid will unite with the lead, and precipitate as *plumbum corneum*; and the vegetable acid will unite with the tin—with which it could not easily be saturated by any other mode; for the acetous acid has very little power to dissolve tin in its metallic form.

The cupreous basis may be obtained from blue vitriol, and from verdigrease, or acetated copper. It is seldom used by itself, but generally in conjunction with alum.

The martial basis, where wool and silk is concerned, is obtained from green vitriol or copperas; but, this basis is best procured for cotton, from a solution of iron in acetous acid, or even as it should seem in the astringent principle. For a solution of iron is used by the dyers of cotton with great success, which is formed by stratifying old iron with alder bark, and digesting them in water.

It

It may alſo be worthy of remark, that cotton, having but a weak attraction for colouring matter, requires that it ſhould be preſented under every advantage: and the Dijon Academicans having proved, that the mineral acids are deſtructive of the aſtringent principle, in which the colouring matter of thoſe ſubſtances requiring a baſis ſeems to reſide; this property, added to others, may be a reaſon for their rejection, and for the preference given to the acetous acid.

Having thus given an account of the various preparations that are generally uſed for wool, ſilk, and cotton, and of the baſes, applied for the reception of the colouring matter, let us next take a view of the *particular* preparatory operations, practiſed in the proceſs for dying the Adrianople or Turkey red on cotton; and to theſe alſo add a detail of the proceſs itſelf. It is proper to premiſe, that all the wooden veſſels employed ſhould be made of deal, or of ſome white wood, free from aſtringent matter; and that the moſt convenient quantity for operating on, in proportion to the ingredients uſed in the ſeveral operations, is ſixty-ſix pounds of cotton.

From ſixty pounds of Alicant barilla, a ley is drawn, by means of ſoft water, amounting to ſixty gallons—and then, by the pouring on of freſh water, a ſecond ley is formed, meaſuring forty gallons—after this, a third ley is alſo extracted from

from the ſame barilla, the quantity of which ſhould be about fifty-two gallons.

A liquor is alſo prepared, conſiſting of four gallons of ſheeps' dung, collected, after it has been excreted from the animal, and before it has been expoſed to rain, diſſolved in twenty gallons of water, and ſtrained through a hair ſieve, to ſeparate from it the groſſer parts.

Theſe preparatory meaſures being taken, the firſt operation conſiſts in adding nine pounds of Gallipoly oil, to eight gallons of the ſecond barilla liquor; this forms a kind of ſoap, to which are to be added twenty-four gallons of the firſt barilla liquor, twelve gallons of the dung liquor, and forty-eight gallons of ſoft water. Into this liquor, when nearly of a ſcalding heat, the cotton is to be put; room being made for it by taking out about twenty gallons of the liquor, which is to be gradually returned into the pan, in proportion to the waſte by evaporation: and the whole is to be kept boiling, during five hours. After which the cotton is taken out of the pan, ſuſpended over it to drain, and then well rung, waſhed in clear water, and hung on ſmooth poles to dry, either in the open air, or in a ſtove; but the former is to be preferred, if the weather be fair.

The liquor wrung out of the cotton is to be preſerved, together with the remainder in the pan, for a future operation; and, at this time,

ſixteen

ſixteen gallons of ſoft water are to be added to the dung liquor.

The ſecond operation conſiſts in pouring three pounds and half of Gallipoli oil, into a bucket, containing four gallons of the ſecond barilla liquor, and adding this mixture to ſix gallons of the firſt barilla liquor, and four gallons of dung liquor. Of this compoſition two or three gallons are to be put into a tub, and, in it, about a pound and quarter of the cotton is to be well ſoaked, and afterwards wrung, but not too cloſely, over a tub, kept for that purpoſe. A ſimilar portion of cotton is then to be treated in the ſame way; and ſo on, till the whole has paſſed through the mixture; adding about a pint or three half pints of liquor, on the immerſion of every freſh parcel of cotton. The cotton is then to be thoroughly dried; which it muſt alſo be after the ſubſequent operations; and theſe are to be conducted in the ſame manner, with reſpect to the manipulations, as in the preſent one.

In the third operation, the liquor which had been wrung out of the cotton, is to be poured back into the tub, in which the ſoaking has been performed: and to this are to be added of Gallipoli oil three pounds and half, and of the ſecond barilla dung, and firſt barilla liquors, four gallons, each. After this operation the dung liquor is to be ſtrengthened by the addition of

of about two handfuls of ſheep's dung, diluted with a little water.

The fourth operation is ſimilar to the third. The liquor which remains, is to be ſet aſide, for the purpoſe of mixing with the reſiduary liquor, after the eighth operation; to be uſed for other cotton, in any ſubſequent proceſs.

The dung liquor is omitted in the fifth operation; and the mixture employed in the three following operations is called the white liquor, to diſtinguiſh it from that uſed in the three preceding parts of the proceſs, which, from the colour imparted by the dung is named the green liquor.

The ſame quantity of oil, as before, is to be mixed in a bucket with four gallons of the ſecond barilla liquor; and poured into a tub, where are to be added to it, three gallons more of the ſame liquor, and four gallons of the firſt barilla ley. About four gallons of this liquor remain after the wringing, and theſe are to be added in the ſixth operation. To the ſame quantity of oil, firſt mixed with four gallons of the ſecond ley, and then with two gallons (more or leſs, in proportion to the quantity of white liquor remaining after the preceding operation) of the ſame ley, and four gallons of the firſt.

In the ſeventh operation, the quantities of all the ingredients are the ſame as in the ſixth. The reſiduum of the white liquor, after the three laſt operations

operations, will be about eight gallons, and is to be preſerved to be uſed in the fourteenth operation.

The eighth operation conſiſts in heating the third barilla liquor, amounting to fifty-two gallons, to about the warmth of new milk; removing it, when thus warmed, from the copper to a tub, immerſing the whole of the cotton therein, and ſuffering it to remain for twelve hours, or longer. It is then to be taken out, and laid on a cloth ſpread on four or five ſticks, placed acroſs a large tub, into which the liquor drains, as it runs from the cotton. The cotton is then to be well wrung, and afterwards thoroughly waſhed, that no looſe oil may remain, which would be injurious to the next operation.

The wringing tub and peg are, now, to be well waſhed, and a freſh ſet of poles uſed; for if any oil were to come into contact with the cotton, in the next parts of the proceſs, it would recive a blackiſh tinge in the dying.

The galling forms the ninth operation.—Sixteen pounds of galls, or if the blue galls be uſed, a ſomewhat ſmaller portion, are put into twenty-four gallons of water, nearly boiling. The liquor is then brought to boil, and the ebullition continued for fifteen minutes. But as ſoon as the boiling commences, the fire ſhould be withdrawn; as the heat already received, will keep it

it up for a ſufficient time, and the galls will not ſettle if it be too violent. The liquor is to be carried to the wringing tub, in the quantity of three or four gallons at a time, according as it is ſoaked up by the cotton, till one half of it has been thus employed. And the cotton is to be worked in it, as hot as poſſible, by means of a ſtick paſſed through the ſkains. After this, it is to be dried either wholly, or in part, in the open air. If it cannot be thus completed, for rain would in this ſtate, and eſpecially as the cotton approaches to dryneſs, be highly prejudicial, the drying muſt be finiſhed in a ſtove. The liquor which has been wrung out is to be added to the remaining half in the copper.

For the tenth operation, this remaining decoction of galls is to be heated, the thick ſediment at the bottom being previouſly ſeparated by a hair ſieve, and the cotton again treated as in the ninth operation.

The eleventh operation is the aluming of the cotton. Thirty pounds of Roman alum, finely powdered is put into ſixteen gallons of water, gradually heated, and continually ſtirred. As ſoon as it becomes ſo hot that the operator can eaſily bear his hand in it, the fire is to be removed. Six gallons of the firſt barilla liquor are, then, to be added, by degrees, and the whole agitated till the ſolution is complete.

The cotton is to be placed in the wringing tub, about three gallons poured on it, and in proportion as the ſolution is ſoaked up, more is to be added, till about one half of it is employed. The cotton, having been thoroughly worked in the alum liquor, is to be well wrung and dried, and the portion which is wrung out, is to be returned to the remainder in the pan, and uſed in the twelfth operation, which is performed, exactly in the ſame manner as the eleventh. After which the dried cotton is to be well waſhed, by handfuls, in running water, the workman holding in each hand, about twenty ounces of cotton. for two minutes. Each portion is then wrung, and ſeparated, waſhed and wrung again, and laid upon a coarſe cloth. The whole is then carried up from the river, wrung a third time and hung to dry. The cotton will now be ready for the thirteenth operation, in which the colouring ſubſtance is applied to the cotton.

The cotton is firſt divided into four equal parts, each of which is to be dyed ſeparately; and theſe are ſubdivided into ſkains or parcels of about a pound and quarter each. The copper pan is then to be filled with water, within about ſix inches of the top; and twenty ſix pounds of Smyrna, or rather of Cyprus madder, added to it. As ſoon as the water becomes milk warm, fourteen pounds of ſheep's blood, as freſh as it

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can be procured are to be ſtirred into it. When the liquor is ſo warm that the workman can juſt bear his hand in it, one fourth part of the cotton is to be put into it, ſuſpended on ſticks; by means of which it is moved backwards and forwards in the pan, every five minutes; and the ſkains are to be inverted every ten minutes, ſo that they may receive the dye equally in every part. This buſineſs is continued for about fifty minutes. The cotton is then hung on five ſticks only, and ſo ſuſpended by ſtrings as to be wholly immerſed in the liquor, which is now made to boil, and continued boiling for forty-five, or fifty minutes. A white froth, which about this time appears on the ſurface is a ſign that the madder is exhauſted of its colouring matter, and that the cotton can receive no benefit, though it will get no injury from continuing longer in the liquor. It is then to be withdrawn, carried to be well waſhed in the river, or waſh-wheel, and then wrung and dryed.

The other three fourths of the cotton, are then to be ſucceſſively dyed in the ſame manner, freſh ingredients being uſed for each parcel.

The fourteenth operation is repreſented as highly eſſential to the ſucceſs of the proceſs. Should it be omitted, the colour, it is ſaid, would not only be ſo unfixed, as to loſe much in the ſubſequent operation, but would likewiſe

require more time for the enlivening. About eight gallons of the white liquor, which remained after the ſeventh operation and were directed to be reſerved, are now to be mixed with four gallons of the firſt barilla ley. Two gallons of this mixture being put into the wringing tub, the whole of the cotton is to be waſhed in it, adding more liquor in proportion as it is ſoaked up by the cotton; which is afterwards to be wrung and dryed.

To this ſucceeds the fifteenth and laſt operation, viz. that of enlivening or reviving the colour. The copper pan being about half filled with water, twenty-eight or thirty gallons of the liquor remaining after the firſt operation, are to be added, ſo that the liquor may reach to within ſix inches of the top. When the liquor is nearly boiling, the cotton is to be put in; being previouſly formed into parcels of about two pounds and a half each; nearly four ounces being kept ſeparate, for a purpoſe hereafter to be deſcribed.

The cotton is to be well preſſed down in the pan, and confined by ſticks. The pan is covered with a wooden lid, having a ſmall hole, through which the ſmall portion of cotton, reſerved for that intention, may be occaſionally withdrawn, in order to obſerve the progreſs of the operation. This hole has a moveable cover. The lid is then to be ſecured by a ſtrong croſs

of

of wood, with a ſtraight piece over it; and the ſides made cloſe, ſo as to confine the vapour, by laying round the edges of the lid, a quantity of damp linen cloth. The fire is then to be raiſed, ſo as to make the liquor boil, and the boiling is to be continued, for nine hours.

The proceſs is finiſhed by taking the cotton out of the liquor, wringing and drying it. But the drying is never to be performed either in a ſtove, or in ſtrong ſun-ſhine. The colour will be moſt brilliant, if the cotton be dried in the ſhade, with a free acceſs of air.

I muſt beg the indulgence of the Society for another diviſion; in which I ſhall endeavour to give a theory of dying, as far as *baſes* are concerned; and eſpecially of the proceſs of which we have juſt given a detail.

PART THIRD.

READ JANUARY 3, 1786.

NOTHING can lead more effectually to the improvement of any art, than a right underſtanding of the inſtruments, or agents employed in the practice. Though long experience may eſtabliſh a number of facts, yet if the rationale of the manner by which they are produced be not underſtood, miſapplications are

liable to be made; ſimilar practices are purſued, where the caſes differ eſſentially; and improvements are attempted at hazard, and often on falſe principles.

Though it may not be granted, that in the ſcouring of the ſeveral materials, which are to be ſubjected to the art of the dyer, their tubular pores are enlarged, or even diveſted of any matter which obſtructs them; yet it will not be diſputed that the intention of theſe proceſſes, is to remove, an oily or a reſinous matter which inveſts the fibres, and fills up the interſtices of the filaments; either rendering the material leſs white, or leſſening its attraction for water, and for the colouring matter, intended to be applied. For the more brilliant colours, in order that they may be exhibited in their greateſt luſtre, the ſcouring and bleaching is generally carried to ſuch a degree, as only to be ſhort of injuring the texture; and the material always ſuffers a loſs of ſubſtance.

In the preparation for the Turkey red, the caſe ſeems to be different. No bleaching is allowed; and the firſt operation of the proceſs is of a kind, that is rather likely to add to the weight, than to ſubtract any thing from it. The cotton is boiled in a mixture of barilla, or impure mineral alkali, oil, and animal excrement. Were the ſole intention of this operation to ſcour the cotton, or, as the dyers phraſe is, to open

open its pores; would not the barilla alone be more efficacious? And for what reaſon can we ſuppoſe that the ſheep's dung, which contains a quantity of foul, colouring matter, ſhould be added? We have ſeen that in the ſcouring of ſilk, where a perfect ſoap is uſed, ſome portion of it adheres, notwithſtanding the waſhing the ſilk undergoes. The cotton is indeed alſo well waſhed after this firſt operation; but it is moſt likely that water will not be able to remove the whole ſubſtance of this animaliſed ſoap. And it ſeems alſo probable that the imperfect ſoap, or mixture of oil and alkali, together with the dung liquor through which the cotton is ſo often paſſed, will continue to furniſh ſomewhat to it.

For animal ſubſtances, contain an acid which is ſeparated in various forms. We have already ſeen that ſaccharine acid is obtainable from them by means of nitrous acid; the blood affords the Pruſſian acid, and alſo phoſphoric acid. This laſt is contained ſtill more abundantly in the urine and in the bones, but we ſhall defer the conſideration of the uſe of animal acid in dying till we come to treat on the ſubject of baſes.

The idea of animalizing vegetable ſubſtances to promote their attraction for colouring matter, occurred to me many years ſince; and the late Sir Torbern Bergman ſeems to have held a

ſimilar opinion. We have ſeen in the abſtract I have given, of M. Betholet's analyſis of animal and vegetable ſubſtances, that wool and ſilk yield much acid of ſugar, together with a fatty oil, whereas cotton gives no ſaccharine acid, no oil, and, in ſhort, that the whole ſubſtance is capable of being diſſipated in the form of gas, leaving no reſiduum in the retort, and communicating nothing permanent to the nitrous acid which diſtils into the receiver.

I wiſh that ſome perſon, whoſe opportunities and leiſure are greater than mine, would compare, by ſuch an analyſis, cotton, in its natural ſtate, and cotton prepared in the ſeven leading operations for the Turkey red; in order to determine whether it have, by this treatment, acquired properties more nearly approaching to animal matter; viz. whether in the latter ſtate it will afford more acid of ſugar, and give over on diſtillation, an oily matter, reſembling that obtained from animal ſubſtances.

Another point which it might be important to aſcertain is, what increaſe of weight the cotton acquires after each ſteeping. It appears from the account of the Gentlemen appointed to ſuperintend and repeat Mr. Borelle's proceſs, that, previous to the maddering, or imparting of the colouring matter, the cotton had increaſed to the amount of $\frac{1}{5}$ of its original weight, though it had been well waſhed previous

previous to that operation. In this increaſe however, was included what it had acquired in the operations of galling and aluming.

The operation of galling, in this as well as ſome other proceſſes of dying is uſed previous to the application of the baſis to the material. Galls contain an aſtringent matter to which chemiſts have lately given the appellation of the aſtringent principle; and the Dijon Academicans have proved it to be of an acid nature. It has not only the property of decompoſing metallic, but alſo earthy ſolutions, and of combining, with the precipitates which fall from them. Hence its uſe previous to the aluming in the proceſs of dying. Steep cotton, which has not been galled, in a ſolution of alum, the ſolution remains clear, and the cotton, when dried, ſhall be covered with aluminous cryſtals. Let another parcel of cotton, which has been galled, be immerſed in a ſimilar ſolution, the liquor ſhall become turbid, and plain marks of precipitation appear.

This aſtringent principle is of ſtill farther uſe in the art of dying, and we ſhall preſently ſee the manner in which it acts, when combined in thoſe vegetables which afford colouring matter.

Having thus given an account of the previous operations in dying relative to the application of

of the baſis, let us next inquire into the principles on which this application is made, and the modes by which it is more firmly attached to the material.

We have already remarked, that alum contains an earth in its compoſition, united to vitriolic acid. This earth is purely argillaceous, and may be ſeparated from the acid to which it is united, by any ſubſtance to which either the earth or the acid, has a ſtronger attraction than they poſſeſs to each other.

The firſt theory we meet with to account for the action of alum and other intermediate ſubſtances uſed to furniſh baſes for colouring matter in dying, is that of M. Hellot, who ſuppoſes that theſe ſaline bodies form vitriolated tartar, a ſalt difficult of ſolution in water; and, that the minute cryſtals of this ſalt, inſinuate themſelves into the pores of the material to be dyed; that to theſe cryſtals the colouring matter becomes attached and firmly united, and they to the material, ſo as to reſiſt the ſolvent power of water. Thus, when tartar and alum are uſed, he imagines the vitriolated tartar to be formed from them; and, in every other caſe of dying, he accounts for the production of a vitriolated tartar; but often in a manner by no means ſatisfactory. This vitriolated tartar, he deſcribes, as cryſtallizing in the dilated pores of the cloth; attracting the colouring matter; and being

being difficult of solution in water, detaining the colouring particles, which are farther cemented by the crude tartar.

But though these salts are not *easily* soluble in water, yet a *sufficient* quantity of water will dissolve them; and, if the colouring particles were attached to them, they must be carried off whenever the solution of the salts is effected. But as this is not the case (for when these particles are properly affixed to the material, they are not moveable by any quantity of water, however large) their fixity must depend on some more permanent basis.

Mr. Keir, the ingenious translator of Macquer's Dictionary of Chemistry, appears to have been the first who suspected that the earth of alum was precipitated, and in this form attached to the material. Indeed it seems wonderful that this idea did not occur to M. Hellot, who was fully aware that in the dying of scarlet, the cochineal became firmly united to the white calx of tin.

M. Macquer, in the last edition of his Dictionary, has been more explicit on this subject. From the experiments which have been alluded to, in the second part of this paper, by which laques and carmine are made by pouring solutions of alum or of tin, into clear decoctions of extractive resinous colouring ingredients, he concludes that the same effects take place in dying; that when the materials are loaded with these earthy

earthy or metallic ſalts, and then thrown into the liquors impregnated with the colouring ſubſtances, the colouring matter quits the other principles to which it was united, ſeizes on the earthy baſis of the ſalt, and uniting with it, loſes its ſolubility in water, and, in this combination, becomes attached to the material, in ſo permanent a manner, as not to be waſhed away by water. M. Macquer, however, does not ſeem to have been aware that it is by means of the aſtringent principle that this precipitation is effected. All the ſubſtances which form laques contain this principle; as is evinced by the blackneſs they produce with martial ſolutions; and to this the colouring principle ſeems to be cloſely united. A few drops of infuſion of galls produces an immediate precipitation of the earth of alum from its acid. This precipitation is more copious than that produced by any of the common colouring ſubſtances, and is, at the ſame time, white.

Here again new experiments are ſuggeſted. Let a large quantity of earth of alum be thus precipitated by galls. Let the precipitate be well waſhed, and afterwards expoſed in a retort, with a receiver adapted to it, to a ſtrong heat. The aſtringent principle, if united to the earth of alum, being volatile, will probably be driven over into the receiver, and thus the ſuppoſed combination be rendered evident.

Again,

Again, let the ſupernatant liquor, from which all the earth has been precipitated, be examined, to ſee in what ſtate of combination, the vitriolic acid of the alum, remains.

In the common dyes, then, with metallic or earthy baſes, the theory is pretty clearly as M. Macquer has repreſented, only taking the aſtringent principle into the account; and, with reſpect to wool and ſilk, nothing more ſeems neceſſary than the impregnation of the one, with alum and tartar, and, of the other, with alum alone, previous to their immerſion in the coloured liquor.

But when COTTON is to be dyed, and ſome of theſe baſes are requiſite, not only the baſis is to be precipitated by the aſtringent colouring principle, but the attraction of the material to the baſis is to be increaſed by other intermedia. The permanency of the extractive dyes, therefore, depends on the previous treatment of the cotton, and, where alum is employed, of that ſalt, ſo as to procure a more copious precipitation of its earth, and to unite it, by means of other ſubſtances, to the material.

For this reaſon, in the common dying of cotton, the alum is previouſly neutraliſed by the addition of alkaline ſalt, whereby not only the acid is prevented from injuring the cotton, but the alum is put into a ſtate more ready to

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be precipitated by the aſtringent colouring matter.

For this reaſon alſo, in the proceſs of callico printing, the earth of alum is made to change its natural acid for the acetous. For by this means, not only a ſalt is prepared, capable of diſſolving more copiouſly in water than common alum, but, the acetous acid being more looſely attached to the aluminous earth, is, as it becomes concentrated by drying, eaſily driven off by heat; the earth being left ſpread upon, and cemented to, the callico.

When ſpeaking of the uſe of animal ſubſtances, it was obſerved, that they yield ſeveral different acids by various modes of analyſis, viz. The phoſphoric, the ſebaceous, the Pruſſian and the ſaccharine. Of theſe the two firſt are formed in the animal ſyſtem, the third is perhaps the creature of fire, and originates from a combination of ſome of the more ſimple conſtituent parts of animal ſubſtances; and of the laſt it ſhould ſeem that theſe ſubſtances only contain the baſis*. M. Bertholet by uniting cauſtic alkalis with animal ſubſtances is ſaid to have found them neutraliſed, and that the animal matter, when afterwards ſeparated from the alkali, is no longer ſuſceptible of putrefaction. This animaliſed neutral ſalt may be decompoſed by means of alum,

* Critical Review, vol. LXII. p. 377.

and

and, while the vitriolic acid ſeizes on the alkali, the earth of alum becomes intimately combined with the animal acid. It appears to me highly probable, that this acid is ſupplied to the cotton, in the proceſs for dying the Adrianople red. That the attraction between the cotton and acid being ſtrong, and that between the latter and the earth of alum being likewiſe powerful, ſuch an union is effected as aſſiſts in rendering the material capable of attracting and retaining the colouring matter, in as forcible and permanent a manner, as can be done either by wool or ſilk.

The uſe of the galls alſo in this and other proceſſes ſeems intended to promote a ſimilar purpoſe. Cotton either unbleached, or which has undergone no proceſs but that of bleaching, when immerſed in a ſolution of alum, produces no change in the appearance of the ſolution; but as has been already ſhewn, cotton previouſly ſteeped in an infuſion or decoction of galls, ſoon renders the liquor turbid, occaſioning a precipitation of the earth of alum on the cotton.

The imperfect ſoap alſo, formed by the union of the alkali and oil when mixed with the alum, will both decompoſe that ſalt, and be itſelf decompounded, and a ſoap of a different nature will reſult from the union of the oil, with the earth of alum. M. Bertholet who has made ſeveral experiments on earthy and metallic ſoaps, found this

this argillaceous ſoap to be totally inſoluble in water and in ſpirit of wine. It is probable alſo that the blood which is employed with the madder, may ſupply both animal ſalts and a glutinous matter to the cotton. This ſeems to be the uſe of the blood, and not, as M. Borelle ſuppoſes, to communicate a pinky tinge to the madder.

Here then appear to be ſeveral different ſubſtances employed, tending to form inſoluble compounds with the argillaceous earth of the alum. But whether, when depoſited on the cloth, they remain ſo many diſtinct compounds, or may all unite into one inſoluble body, I do not pretend to determine.

M. Macquer, whoſe opinions always deſerve the moſt reſpectful attention, declares, that the excellence and permanency of the Turkey red depends on the great quantity of alkali, uſed in the proceſs of aluming, rediſſolving the earth of alum after its ſeparation from the vitriolic acid, and forming with it a ſaline compound, eaſily ſeparable into its conſtituent parts, ſo that the aluminous earth may be conveniently depoſited on the cotton and united to the colouring matter. The following is a tranſlation of his own words, from the laſt edition of his Dictionary.

"In examining," ſays this excellent chemiſt, "the effects of all the complicated operations, "attendant

" attendant on the Levant or Adrianople proceſs " for giving to cotton a more beautiful and du- " rable red, by means of madder, than can be " communicated by the common methods, I " was ſtruck with a ſingularity which attends " the aluming in this proceſs, and conſiſts in " mixing a great quantity of alkali with the " ſolution of alum, previous to the impregnation " of the cotton with it.

" As the alum is certainly decompoſed, by " the mineral alkali, in this operation, I wiſhed " to diſcover what was the reſult; and I found " the alkali, at the inſtant it precipitated the " earth of alum, rediſſolved a conſiderable part " of it, and that the alkaline ſalt with aluminous " baſis is the real mordant in the Levant proceſs. " I have actually determined, by ſuitable ex- " periments, 1ſt. that both fixed and volatile " alkalis, eſpecially if cauſtic, are capable of " reducing to a ſaline ſtate a ſufficiently large " portion of earth of alum, even in the moiſt " way; and that, by calcination, the fixed alkali " is capable of diſſolving a ſomewhat larger " quantity of this earth. 2dly. That this alka- " line earthy ſalt is decompoſed, even by water " alone, but ſtill more eaſily by means of a " decoction of madder, or other extractive tinc- " tures, on the colour of which the earthy part " of the ſalt ſeizes, and forms with it a laque, " or coloured precipitate, in the ſame manner

" as the mordants when formed of an acid com-
" bined with an earth or a metal. 3dly. I have
" proved, by ſeveral experiments that when
" cotton or linen is impregnated with a ſtrong
" ſolution of this alkaline mordant without any
" other preparation than ſcouring and galling,
" theſe ſubſtances receive, in the madder bath, a
" red much more beautiful and deep, than can be
" given them, when alum alone is uſed.*"

Notwithſtanding my deference for the opinion of this great man, yet I muſt on this occaſion differ from him, for reaſons which, it is hoped, will prove ſatisfactory to this ſociety.

1. The portion of barilla uſed in the operation of aluming, is only ſix pounds, ſuppoſing the whole quantity employed to be diſſolved in the firſt liquor; but as there are two other ſolutions made before the whole of the ſalt is diſſolved, it is probable that ſix gallons of the firſt liquor, will not contain near one half of that weight; for the barilla being dry and hard, and the mineral alkali leſs ſoluble than the vegetable, the firſt water will act but ſlowly on it; and it is obſervable that, through the whole proceſs, the ſecond liquor is conſidered as the ſtrongeſt, and uſed for mixing with the oil. Beſides not much above one half of the barilla conſiſts of aërated mineral alkali. We may there-

* Macquer, Dictionaire de Chymie, ſeconde edition, tome quatrieme, article Teinture.

fore

fore conclude that the amount of this ſalt, contained in ſix gallons of the firſt barilla liquor, the quantity added to thirty pounds of alum, does not exceed one pound and half. Now as 100 parts of alum contain 38 of vitriolic acid, theſe will require for their ſaturation, 37 of aërated mineral alkali; ſo 30 parts of alum containing 11 : 4 of that acid, theſe will require for their ſaturation 11 : 1 of the ſame alkali. Whereas the quantity employed amounts only to 1 : 5; or rather more than $\frac{1}{8}$ of the quantity requiſite for the neutralization of the acid. And as a ſuperabundant quantity of the precipitant, above what is neceſſary to the ſaturation of the acid, is neceſſary before re-ſolution of the precipitate can take place, we have in this caſe no reaſon to expect it.

2. The quantity of alkali employed is not ſuperior to that uſed in the aluming in other proceſſes for dying with madder.*

3. The alkali, being aërated, is in the moſt unfavourable ſtate for rediſſolving the aluminous earth; and

4. The re-ſolution of the aluminous earth takes place only ſo long as any of the ſuperabundant vitriolic acid remains unneutraliſed; except the addition of alkali be continued, after the precipitation of the aluminous earth is

* $\frac{1}{6}$ or $\frac{1}{5}$ of the alum.

wholly effected: and it cannot be ſuppoſed that the alkali with which the cotton has been impregnated, in the previous operations, added to that contained in the barilla liquor, mixed with the alum can be ſuch, even if it were in an uncombined ſtate, as to produce ſuperſaturation.

It ſhould ſeem probable therefore that the permanency of the Turkey red depends on the cauſes already aſſigned, and that its brightneſs is produced by the action of the mineral alkali on the madder. This appears, at firſt ſight, diſcordant with the theory of Mr. Delaval that alkalis reduce red colours to crimſon, and theſe to purple; whereas in the preſent caſe the red is brightened, by boiling in a ſtrong ſolution of mineral alkali; but the fact is perfectly agreeable with that theory; for the madder colour is too much inclining to a duſky orange, and this, by means of the incraſſating alkali, deſcends to red.

Before I conclude, permit me to advance a few circumſtances relative to the black dye.

For the dying of black, the calx of iron is the mordant employed, and this uniting with the aſtringent principle of the galls forms a black pigment which is attracted and adheres to the material to be dyed.

The late Dr. Lewis had aſcertained, by a number of well conducted experiments, that the colouring matter of ink, conſiſted of a very finely attenuated calx of iron, combined with this

this principle. He found alſo that this matter, (which, if not kept ſuſpended by ſome mucilaginous ſubſtance, ſeparates and precipitates from the liquor) reſembles, in ſome degree martial æthiops, but that it was not, like that powder, attracted by the magnet, till after it had been expoſed to a red heat; when it loſt its blackneſs, and became of a ruſty brown colour:—a proof that the black colour of ink or of the black dye, which is formed on ſimilar principles, does not depend, merely, on the iron acquiring phlogiſton from the galls. He alſo found that both acids and alkalis deſtroy blackneſs thus produced; the former by diſſolving the ferrugineous body, the latter by acting on the aſtringent principle. He, however, was of opinion, that this principle was of a fixed, not a volatile nature. But our worthy preſident, Dr. Percival, very early ſuſpected that this aſtringent principle poſſeſſed ſome volatility. In ſupport of his opinion, he mentions, artichoke ſtalks, loſing their aſtringent principle by being dried in an oven. He likewiſe appears to be the firſt who obſerved the action of acids and aſtringents on each other.

The ſubject has been farther purſued by the Dijon academicians; from the reſult of whoſe experiments it appears, that the aſtringent principle is ſoluble in water, in ſpirit of wine, in oils, and in æther; that it riſes copiouſly

in diſtillation, reddening the blue vegetable juices, but capable of uniting, with equal facility, with acids, and with alkalis. That though it does not revive iron, without the aid of fire, yet gold and ſilver are precipitated, by it, in their metallic form; and that it is capable of decompoſing moſt metallic ſolutions, and giving different colours to their precipitates.

Dr. Percival had endeavoured to produce an ink, by macerating iron filings, without their being combined with any acid; but, making his infuſion without heat, he did not ſucceed. The Dijon chemiſts, not content with making a ſimilar attempt, boiled the liquor; and thus obtained a violet coloured ink, the traces of which were as well defined and permanent, as thoſe produced by ink prepared in the common way, even without the addition of gum. Hence it ſhould ſeem, that the heat not only enabled the aſtringent principle to diſſolve the iron, but alſo extracted a mucilaginous matter which ſupplied the uſe of gum.

I have related theſe facts in order to elucidate ſome circumſtances attending the dying of black. Green vitriol was formerly uſed; but the calx of iron is too much dephlogiſticated in this ſalt, and the black produced by it is not permanent. Solutions of iron in acetous acid have of late been preferred, eſpecially for cotton;

cotton; and even ſolutions of that metal, made by macerating it with alder bark and water, in which the aſtringent principle ſhould ſeem to unite with the vegetable acid, to form the ſolvent. In theſe ſolutions the iron is not too much deprived of its phlogiſton; and contrary to thoſe made in mineral acids, they improve with age, for the vegetable acid, tending to putridity evolves phlogiſton, which unites with the iron; whereas the vitriolic ſolution is continually parting with that volatile principle, and thereby becoming not only leſs fit for producing blackneſs, but the calx of iron, when highly dephlogiſticated, is very injurious to the texture of the cloth.

The improvements made in the dying black, are perhaps the ſtrongeſt proofs that can be given of the utility of chemical knowledge. Nor can a more apt inſtance be adduced of the inconvenience ariſing from the want of it, than the French proceſs, related by M. Macquer for this purpoſe; in which no leſs than thirty different ingredients, or at leaſt bearing different names, are directed to be employed; ſeveral of which are the ſame things under different denominations; and others tend directly to deſtroy each other.

I know not whether to apologiſe more to the Society, for the length of this paper, or for the imperfections it contains. The former I could

not well avoid, in order to make it sufficiently comprehensive; and for the latter, I must beg leave to plead my numerous avocations which have caused me to compile it in haste, and in a very interrupted manner.

Observations *respecting the* History *of* Physiognomy; *by* Thomas Cooper, *Esq.*

THE dispute among the Literati of the last century, on the comparative merit of the ancients and moderns, has at length subsided. The few late attempts by some of our writers* to reinstate Plato and Aristotle at the head of the ranks of science, have been coolly received; and the moderns in general have acquiesced in their own pre-eminence. There seems indeed some reason for this decision in our own favour: and it will be readily acknowledged, that within a century or two, we have greatly extended the bounds of knowledge, by contenting ourselves with slow but sure advances, and by relying upon fact and experiment in pre-

* Harris Monboddo.

ference

ferenee to conjecture and hypotheſis. I cannot help thinking however, that although we may have ſhewn many of the ancient ſyſtems to be merely the creatures of imagination, we have in ſome caſes concluded much too haſtily; and unreaſonably denied the exiſtence of that knowledge, which we have not been at the pains of acquiring.

Theſe obſervations ſeem to me to be ſufficiently applicable to the *ſcience of phyſiognomy*; a ſcience, which, though practiſed by Pythagoras,* defended by Socrates,† approved by Plato,‡ and treated by Ariſtotle,‖ is hardly mentioned at preſent, but in conjunction with magic, alchemy and judicial aſtrology. Without any pretenſions however to a knowledge of phyſiognomy as a ſcience myſelf, I have always regarded it in a light more reſpectable; and as the recently publiſhed work of M. Lavater ſeems to have excited a conſiderable degree of attention on the continent, the ſociety perhaps will not be diſpleaſed, if I lay before them ſuch

* Auli Gellii, lib. I. cap. 9.

† Cic. de fat. V. & Tuſc. Quæſt. XX. IV.

‡ In Timæo.

‖ Phyſiognom. Ariſtotles Phyſiognomy has been ſuſpected as ſpurious, but without ſufficient reaſon. Diogenes Laert. quotes it, lib. V.

literary

literary obſervations reſpecting the progreſs of phyſiognomy as my reading has ſuggeſted.

There has been ſome diſpute* reſpecting the *etymology* of the term; ſome deriving it from φυσις nature and γιγνωσκω to know; others from φυσις and γνωμων an index; others from φυσις and γνωμη a mark; according to theſe laſt derivations, phyſiognomy, will be, a knowledge of nature from the indices or marks of it. This extended ſignification to which the etymology of the word leads, I have noticed, becauſe I think it is remotely connected with the doctrine of *ſignatures*.

For the ſame reaſon it may be worth while to mention the controverſies reſpecting the *definition* of phyſiognomy. The ancients ſeem to have confined phyſiognomy to man, or at leaſt to animated nature. Thus Ariſtotle,† *nunc autem dicam ex quibus generibus ſigna accipiantur: et ſint omnia; ex motibus enim phyſiognomizant et ex figuris et coloribus, et ex moribus apparentibus in facie, et ex levitate, et ex Voce, et ex Carne, et ex partibus et ex figura totius corporis.* So Cicero,‡ ——*hominum mores naturaſque, ex corpore oculis vultu,*

* Voſſius Etymolog. & Martini Lexicon ſub voce.

† Phyſiognomic. cap. II. αλλ ων δε γενων τα σημεια, &c. To ſave the room that the originals *and* tranſlations of all the paſſages quoted, would occupy; I have given the Latin verſions only of the Greek quotations.

‡ De fato. V.

vultu, fronte pernoſcere. To the ſame purpoſe Aulus Gellius,* *Id verbum ſignificat mores naturaſque hominum conjectatione quâdam, de oris et vultûs ingenio, deque totius Corporis filo atque habitu ſciſcitari.*

But when the ſtudy of phyſiognomy was revived in the middle ages, the comprehenſiveneſs of the etymological meaning (as I imagine) led thoſe who treated on the ſubject, to indulge the prevailing taſte for the marvellous, and extend the ſignification of the word, far beyond the ancient limits. This ſeems to have been particularly the caſe among thoſe naturaliſts who adopted the theory of *ſignatures*. Hence phyſiology came to ſignify, the knowledge of the internal properties of *any* corporeal being, from the external appearances. Thus Joannes Baptiſta Porta, a phyſiognomiſt and philoſopher of great note, wrote a treatiſe concerning the phyſiognomy of *plants* (Phytognomonica) throughout which he uſes phyſiognomy as the generic term. The ſame perſon I believe it was, who wrote the Treatiſe *de Phyſiognomia Avium*. Gaſpar Schottus, in his *Magia Phyſiognomica*, makes the *phyſiognomia humana*, a ſubdiviſion of the ſcience. Hen. Alſted† adopts alſo the extenſive ſignifica-

* Lib. I. cap. 9. † In his Cyclopædia.

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tion now mentioned. So alſo does Boyle,* and it ſeems to have been the common one with us, in the time of Hudibras.† At preſent phyſiognomy ſeems to be confined to the knowledge of the moral and intellectual character of human creatures, from their external manners and appearance.

Theſe variations of the meaning however, it was proper to notice, not only for the reaſon before aſſigned, but becauſe the *definition* of phyſiognomy was a ſubject of long diſcuſſion between two modern authors of ſome note, in the Berlin Tranſactions,† M. Pernetty and M. Le Cat. The former inſiſted that *all knowledge* whatever, was merely phyſiognomy, and the latter, as unreaſonably, confined it to the ſubject of the *human face*. Mr. Pernetty's ſecond Memoire is entirely occupied, in defending the extenſive ſignification he has annexed to

* Experimental hiſtory of mineral waters; append. § 4. "And I have ſometimes fancied there may be a phyſiognomy of many if not of moſt other natural bodies as well as of human faces, whereby an attentive and experienced conſiderer may himſelf diſcern in them many inſtructive things that he cannot ſo declare to another man as to make him diſcern them too.

† They'll find i' th' phyſiognomies
O'th planets all men's deſtinies.

† For the years 1769 and 1770.

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the term, and which had been controverted by M. Le Cat. The ſubject did not drop here: ſoon after appeared the celebrated Treatiſe of Mr. Lavater, who although he expreſsly defines phyſiognomy, the art of diſcovering the interior of a man by means of his exterior; * does more than countenance † the extended ſignification of the term, adopted by M. Pernetty. This work produced an attack upon phyſiognomy itſelf in the Memoires of the ſame academy for the year 1775, by M. Formey, who beſtowed a great deal of pains in controverting the extent which M. Lavater had aſſigned, to his favourite ſcience. The common idea annexed to phyſiognomy before mentioned, ſeems upon the whole as proper as any that have been given.

I do not find any authority ſufficient to conclude that phyſiognomy was treated as a *ſcience*, (at leaſt in Greece,) before the time of Pythagoras. Of him it is aſſerted by Aulus Gellius, ‡ *Ordo atque ratio Pythagoræ ac deinceps Familiæ ſucceſſionis ejus recipiendi inſtituendique diſcipulos hujuſmodi fuiſſe traditur. Jam a principio Adoloſcentes qui ſeſe ad diſcendum obtulerunt* εφυσιογνωμονει.

* Vol. I. p. 22, of the French edition, 4to.

† Ibid, p. 33, and vol. II. p. 89.

‡ Lib. I. cap. 9.—Proclus in Alcib. prim. Plat.—Iamb. in vit. Pythag. ſub. Init.

Id

Id verbum ſignificat mores naturaſque hominum conjectatione quâdam, de oris et vultus ingenio deque totius corporis filo atque habitu ſciſcitari. It is not improbable (if this be true) that Pythagoras acquired a great part of his phyſiognomical knowledge, and his attachment to that ſcience during his travels; the Indians* and Egyptians† being great profeſſors of phyſiognomy.

In the time of Socrates, it appears not only to have been ſtudied as a ſcience, but adopted as a profeſſion, of which the known ſtory of

* Nicoſtratus ſpeaking of the Indians in his book de Nuptiis, ſays that in marrying they judge of their wives by their appearance, and declare they are never deceived; among the phyſiognomical marks he mentions theſe, *benigni enim oculi, ſummam animi pulchritudinem comitantur, et fieri ſolet ut qui non excandeſcit, nec facilè iraſcitur, aut bile movetur, faciem ſplendidam ſerenamque habet. Malignus et doloſus verò, ſtatim et oculis tranſversè implacideque tuetur. Qui ſtolidus ac ſimplex eſt, pupillas et oculos patentes gerit ut aſini et oves. Cui ſupercilia conjunguntur improbus eſt. Cujus ſuperficies in vultu non rubet, ſed obſcura caliginoſaque eſt nunquam ullo modo exhilaratur. Ceterum ejuſmodi notæ, non modo virginibus et mulieribus, ſed etiam viris inſunt.* Raynaudi Moral. Diſcip. p. 367. See alſo Philoſt. Vit. Apoll. Tyan, lib. III. cap. 30, p. 83. πολλα μεν γαρ ο οφθαλμοι, &c. & lib. III. cap. 5.

† Αιγυπτιοισ μεν γαρ τοισ πασι, &c. Gronov. Not. in Aul. Gell. lib. I. cap. 9. from the phyſiognomy of Adamantius. See alſo Jambl. in Vit. Pythag. lib. I. cap. 17. παρασκευασμενω δε αυτω, &c.

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the judgment paſſed upon Socrates by Zopyrus* is a ſufficient proof; ſubſequently it was noticed by Plato, † and expreſsly treated by Ariſtotle in a diſtinct book. As this forms a kind of literary epoch in the ſcience of phyſiognomy it may be worth while to give a brief outline of Ariſtotle's ſentiments on the ſubject.

He obſerves (in ſubſtance) that the ſubject had been treated in three different ways. That ſome phyſiognomiſts claſſed animals into genera, and aſcribed a certain corporeal appearance, and a correſponding mental diſpoſition to each genus. Others diſtinguiſhed ſtill farther and divided the genera into ſpecies. Thus among men, they diſtinguiſhed the Egyptians, the Thracians, and the Scythians, and wherever elſe there was a known difference in habits and manners, and aſſigned the phyſiognomic marks accordingly. Some decided more from the actions and manners of the individual, taking for granted that ſuch and ſuch manners, proceeded from ſuch and ſuch diſpoſitions. His own method of conſidering the ſubject was this: there is always a peculiar diſpoſition of mind, attendant on a peculiar form of body; ſo that there is never found a human mind, in the corporeal form of any beaſt. Again; it is evident that the mind and the body act mutu-

* Cic. de fato V. † In his Timæus.

ally

ally on each other. Thus in the caſes of intoxication, ſickneſs, and mania, the mind is affected by the affections of the body. In fear, ſorrow, joy, &c. the body is affected by the affections of the mind. From theſe facts he concludes, that wherever a particular form or bodily character, appears in a human creature, and we know before hand from obſervation, and an induction of particulars, that a certain mental character is conſtantly concomitant, and therefore neceſſarily connected therewith, we have a right in all ſuch caſes to infer the diſpoſition from the appearance—and this, whether we have drawn our obſervation from men or other animals. For as there is one mental character, and one corporeal form of a lion, and another of a hare, wherever in human creatures we obſerve the bodily characteriſtics of a lion, (ſuch as ſtrong and thick hair, large extremities, a deep tone of voice, &c.) we ought to infer, ſtrength, firmneſs and courage. Wherever on the contrary, we ſee the ſlender extremities, ſoft capillament, or any other feature of the hare, we ought to conclude a proportional correſpondence in the mental character. Upon this principle he enumerates the various corporeal features of man, and the correſpondent diſpoſitions ſo far as they have been obſerved; and as opportunities offer, he illuſtrates them by an appeal to the foregoing analogy,

analogy, and in ſome caſes attempts to explain them by phyſiological reaſoning.

This plauſible and even probable theory, evinces a conſiderable degree of knowledge on this ſubject, at a very early period—individual phyſiognomy, national phyſiognomy, and comparative phyſiognomy, are here diſtinctly noticed; but it cannot with truth be aſſerted, that the enumeration of particular precepts and obſervations in the phyſiognomical treatiſe of this great man, are equally well founded with this outline of the ſubject. In fact, the ſtate of knowledge in his time, did not admit of a complete elucidation of his general principles, nor was the brief and pithy ſtyle of Ariſtotle adapted to a ſubject, which even at this day will require frequent periphraſis to make it clearly comprehenſible. Such as it is however, this work of Ariſtotle, appears to have ſerved as a foundation for almoſt every phyſiognomical treatiſe that hath ſince been publiſhed. His comparative phyſiognomy of men with beaſts indeed, though frequently, has not been *univerſally* adopted, but his language and his manner, ſententious, obſcure and indiſcriminate, have been copied too cloſely, by his imitators of the ſixteenth and ſeventeenth centuries. Beſide this work of Ariſtotle expreſsly on the ſubject, there are many incidental obſervations reſpecting phyſiognomy that occur in his Hiſtory of Animals, and other parts of his writings.

The ethic characters of *Theophrastus*, the disciple and successor of Aristotle. deserve also to be particularly noticed, as a distinct treatise on a most important branch of the science in question, *the Physiognomy of Manners*. This singular and entertaining performance composed by the author at the age of ninety-nine, describes synthetically, with great justice and accuracy, the most remarkable traits of behaviour which certain predominant characters, would respectively occasion. The translations and imitations of *La Bruyere*, render it unnecessary to give any examples of what otherwise it would be unpardonable to omit: suffice it to observe that this work of Theophrastus evinces such a degree of accurate observation, and lively description as will preserve it in the rank of classical performances so long as, the science of man, and the prominant features of human society, shall continue to be regarded as objects of attention.

About this time *Adamantius the Sophist* appears to have written; whose "Physiognomics" were published in several places about the middle of the sixteenth century. Adamantius however only trod in the steps of *Polemon* the Athenian, who had written before him, and whose treatise was republished in Greek and Latin much about the time of the former.* So many au-

* I was not aware till lately that the Greek writers on the subject of physiognomy were collected and published together, by Franzius, "Physiognomiæ veteres scriptores Græci. Gr. & Lat. à Franzio. Altenb. 1780, 8vo." I have not seen the book.

thors

thors* on the subject, sufficiently shew that physiognomy was much cultivated as a science among the Greeks about this period. The professors of physiognomy however appear soon to have connected with it something of the marvellous, as we may suspect from the story told of Apelles by Apion, *Imaginem adeo similitudinis indiscretæ pinxit ut (incredibile dictu) Apion grammaticus scriptum reliquerit quemdam ex facie hominum addivinantem (quos metoposcopos vocant) ex iis dixisse aut futuræ mortis annos, aut præteritæ.*† From the known practice of the Pythagorean School,‡ whose novitiates were all subjected to the physiognomic observation of the teachers, it is not improbable that the first physiognomists by profession among the Greeks,‖ were of that

* Hermes Trismegistus, Alchyndus, Helenus, Loxius, Pharaotes Indus (mentioned by Philostratus) are also mentioned as writers on physiognomy, but little more seems to be known of them in this respect, than the traditional quotation of their names. Voss. de Nat. Art. lib. I. cap. V. § 19.

† Pliny. Nat. Hist. lib. XXXV. § 35, par. 9.

‡ Aul. Gell. ubi sup. Mos Pythagoræis erat per signa in corpore constituta venientes ad eos judicare, utrum ad meliorem vitam apti forent necne. Natura enim ipsa quæ animis confingit corpora instrumenta eis congrua subministrat, imaginesque animarum in corporibus indicat, per quas et animarum ingenia in hac arte periti deprehendere possunt. Proc. in Alcib. prim. Plat.

‖ There were such probably among the ancient Indians. Vid. the preceding note *.

sect; nor is it unlikely from the mysterious and ascetic nature of the doctrines and discipline of the Pythagoreans, that they also, were first tempted to disgrace the science of physiognomy in Greece, by annexing to it the art divination.

From this time to the close of the Roman republic, few observations occur respecting the literary history of physiognomy. About that period however, and from thence to the decline of the Roman empire under the latter emperors, it appears to have been attended to, as an important branch of knowledge, and adopted as a profession by persons pretending to superior skill in it.

There are many physiognomical remarks interspersed in the works of Hippocrates* and of Galen, † as may well be presumed from their medical profession—Cicero appears to have been particularly attached to it; for he not only relates the story of Zopyrus and Socrates in his book *de fato*, ‡ and his Tusculan Questions, ‡ but his orations abound with physiognomical opinions. Thus, his oration against Piso, commences with the following abusive passage. *Jamne vides bellua quæ sit hominum*

* In his book de Aquis Aeris et Locis.

† In his passages respecting the temperament.

‡ Ubi sup.

querela

querela frontis tuæ? Nemo queritur ſyrum neſcio quem de grege novitiorum factum eſſe Conſulem. Non enim nos Color iſte ſervilis, non piloſæ Genæ, non dentes putridi deceperunt. Oculi, Supercilia, frons, vultus denique totus qui Sermo quidem tacitus mentis eſt, hic in errorem homines impulit: hic eos quibus eras ignotus decepit fefellit, in fraudem induxit. Pauci iſta tua lutulenta vitia noveramus: pauci tarditatem ingenii, ſtuporem debilitatemque linguæ; nunquam erat audita vox in foro; nunquam periculum factum Conſilii; nullum non modo illuſtre ſed ne notum quidem factum aut militiæ aut domi; obrepſiſti ad honores errore hominum, commendatione fumoſarum imaginum, quarum ſimile habes nihil præter Colorem.—In the ſame ſtrain he appeals to his auditors againſt the phyſiognomy of C. Fannius Chærea in his oration in favour of Roſcius the comedian. *C. Fannium Chæream, Roſcius fraudavit! Oro atque obſecro vos qui noſtis, vitam inter ſe utriuſque conferte — qui non noſtis, faciem utriuſque conſiderate — Nonne ipſum caput, et ſupercilia penitus abraſa, olere malitiam, et clamitare calliditatem videntur? Nonne ab imis unguibus uſque ad verticem ſummum (ſiquam conjecturam affert hominibus tacita corporis figura) ex fraude, fallaciis, mendaciis, conſtare totus videtur? Qui idcirco capite et ſuperciliis ſemper eſt raſis, ne ullum pilum viri boni habere.*—I have quoted theſe paſſages, not only as inſtances of Cicero's attachment to the

ſcience of phyſiognomy,* but alſo as examples of the *antient* ſtyle of oratorical abuſe. Similar inſtances of Cicero's manner occur in his obſervation on the features, &c. of Verres, Vatinius, and Anthony: † indeed he aſſerts generally in his book *de Oratore* ‡ *omnes enim motus animi ſuum quendam a natura habent vultum*; which although it may be conſtrued to relate to the tranſient phyſiognomy only, may well be applied to the permanent features in conformity to the paſſages already adduced from the ſame author.

Nor was Cicero, ſingular, among the claſſic authors of Roman literature, in his attention phyſiognomic obſervation. The extracts in the notes from Salluſt, ‖ Suetonius § and Seneca,

* See alſo a paſſage in his book *de Legibus* 1, 9 *Figuram autem corporis habilem et aptam, &c.*

† In his orations againſt them. ‡ Lib. III.

‖ The phyſiognomy of Cataline is very expreſſive, *Colos ei exſanguis, fædi oculi; citus modo, modo tardus inceſſus; prorſus in Facie Vultuque Vecordia inerat.*

§ The deſcription of Tiberius by Suetonius is extremely particular, as indeed are all thoſe he has given us; the following is a part of it; *Colore erat Candido, capillo pone occipitium ſubmiſſiore, ut cervicem etiam obtegeret quod gentile illo videbatur. Facie honeſtâ; in quâ tamen crebri et ſubtiles tumores, cum prægrandibus oculis, et qui (quod mirum eſt,) noctu etiam et in tenebris viderent; ſed ad breve et cum primum a Somno patuiſſent, demum rurſum hebeſcebant. Incedebat cervice rigida*

Seneca,* thoſe already adduced from Pliny † and Aulus Gellius, ‡ and the paſſages I am about to mention from Petronius, Plutarch and others, abundantly eſtabliſh this remark.

Beſide the attention paid to phyſiognomy as a ſcience by authors of repute during the period of the Roman empire, it ſhould ſeem alſo that it continued to be practiſed as a *profeſſion*, as well then, as in the claſſic age of Grecian philoſophy. Plutarch, in his Life of Anthony, tells us of an Egyptian phyſiognomiſt who bade Anthony beware of Octavius. ‖ Petronius Arbiter in his *Satyricon* introduces a perſon ſaying

rigida et obſtipa; adducto ferè vultu, plerumque tacitus, nullo aut rariſſimo cum proximis ſermone, eoque tardiſſimo, nec ſine molli quadam digitorum geſticulatione. Quæ omnia ingrata atque arrogantiæ plena et animadvertit Auguſtus in eo, et excuſare tentavit ſæpe apud Senatum et populum, profeſſus Naturæ vitia eſſe, non Animi. A great part of the character of this emperor may be traced not indiſtinctly in this deſcription — I know of no author whatever ſo minutely attentive to the ſtature, features, geſture, manners and way of life, of the perſons ſpoken of, as Suetonius.

* *Annon vides quantum oculis det vigorem Fortitudo? quantam intentionem prudentia? quantam modeſtiam et quietem Reverentia? quantam Serenitatem lætitia? quantum Rigorem ſeveritas? quantam Remiſſionem hilaritas?* Sen. Ep. 106.

† Nat. Hiſt. lib. XXXV. § 35.

‡ Lib. I. cap. 9.

‖ The phyſiognomic remark of Julius Cæſar reſpecting Anthony and Caſſius is well known.

Vides me? nec auguria novi, nec mathematicorum cœlum curare ſoleo, ſed ex vultibus tamen hominum mores colligo, et quum ſpatiantem vidi, quid cogites ſcio. Quo enim inceſſus arte compoſitus, et ne veſtigia quidem pedum extra menſuram aberrantia, niſi quod formam proſtituis ut vendas?

Suetonius, in the *Life of Titus*, ſays, that Narciſſus ſent a phyſiognomiſt to examine the features of Britannicus, who returned and predicted that Britannicus would not ſucceed, but the empire would devolve on Titus. Other inſtances* of phyſiognomy being exerciſed as

* I had marked a reference to Gregory Nazienzenus Orat. 4. reſpecting Julian as a phyſiognomiſt, but on looking into Gregory for the paſſage I can find none ſuch. I apprehend it muſt have been a miſtake in lieu of the following phyſiognomic character of Julian by Gregory in his ſecond oration againſt that emperor, which is worth noticing. *Sed me morum ipſius inconſtantia atque incredibilis quædam mentis emotio vatem efficiebat: ſi quidem vates ille optimus eſt qui recte conjicere novit. Neque enim mihi boni quicquam ſignificare atque ominari videbantur, Cervix non ſtata, humeri ſubſultantes et ad æquilibrium ſubinde agitati; oculus inſolens et vagus furioſeque intuens; pedes inſtabiles et titubantes; naſus contumeliam et contemptum ſpirans; vultûs lineamenta ridicula idem ſignificantia; riſus petulantes et effrænati; nutus et renutus temerarii; ſermo herens, ſpirituque conciſus; interrogationes ſtultæ et præcipites; reſponſiones his nihilo meliores; aliæque in alias inſultantes, nec graves et conſtantes nec eruditionis ordine progredientes; talem ante opera conſpicatus ſum, qualem in operibus poſtea vidi.* Greg. Naz. Orat. 48 in Jul. 2 cura Joan. Leuenklaii, p. 793.

a profeſſion

a profeſſion, might be adduced, but the preceding paſſages however they may contain a mixture of fable with truth, render the general fact ſufficiently probable.

When the Roman empire was overthrown by the eruptions of the northern nations, this ſcience ſhared the ſame fate with the others, and appears to have been unnoticed (except perhaps by the Arabian commentators on Ariſtotle with whom I am unacquainted) till about the beginning of the ſixteenth century; from which time to the latter end of the ſeventeenth it was greatly in vogue, and almoſt all the approved modern authors who have treated practically on the ſubject publiſhed within that ſpace.* I can-

* Such as Bartholem. Cocles. Baptiſta Porta. Honoratus Nicquetius. Jacobus De Indagine. Alſtedius. Michael Schottus and Gaſpar Schottus. Cardan. Taiſnierus. Fludd. Behmen. Barclay. Claramontius. Conringius. The Commentaries of Auguſtin Niphus and Camillus Balbus on the Phyſiognomica of Ariſtotle. Spontanus. Andreas Henricus. Joannes Digander. Rud. Goclenius. Alexander Achillinus. Joh. Prætorius. Jo. Belot. Gulielmus Gratalorus and ſeveral others, whom Morhoff notices in his Polyhiſtor. vol. I. lib. I. cap. 15, § 4, and vol. II. lib. III. cap. 1. § 4. It may be proper to mention, that the only writers profeſſedly on the ſubject of phyſiognomy, whom I have been able to conſult on this occaſion, are, Ariſtotle. Baptiſta Porta. Gaſpar Schottus. Cardan. Fludd. Behmen. Alſtedius. Le Chambre. Letters on Phyſiognomy. Evelyn. Lanciſi. Dr. Gwither in the Tranſactions of the Royal Society. Pernetty. Le Catt, and Formey, in the Berlin Tranſactions, and Lavater.

not

not help regarding it however, as rather unfortunate for the ſcience of phyſiognomy, that many opinions now juſtly exploded, were holden in high eſtimation not only among the literati in general, of the ſame period, but by the very perſons who were authors on the ſubject of phyſiognomy, and patrons of the ſtudy. Nay, by ſome of theſe writers, phyſiognomy was regard as eſſentially connected with doctrines, which the literature of the preſent day would be aſhamed to adopt, and treated accordingly in conjunction with them.

This remark appears to me, ſo intimately connected with the literary hiſtory of the ſcience in queſtion, as to demand ſome further diſcuſſion.

The hiſtory of human learning, has periods which are marked by the general prevalence of particular ſtudies among the literati of the time. The philoſophers of the early period of Grecian literature, attended chiefly to *mythological morality*. Among the authors of the moſt flouriſhing period of Grecian and Roman literature, until the firſt emperors, *poetry*, *hiſtory* and *oratory*, were the prevailing ſubjects of attention: under the latter emperors, and for ſome time after, the works of the learned exhibit for the moſt part the hiſtory of *theological controverſies*: to them ſucceeded *metaphyſics* and *metaphyſical theology*—when theſe began to decline,

cline, the attention of the learned was awakened to *alchemy*, *magic*, *judicial aſtrology*, the *doctrine of ſignatures and ſympathies*, *the Myſtic*, *Theoſophic* and *Roſicrucian theology* and *phyſiognomy* — then ſucceeded *claſſic philology* — this gave way to *modern poetry* and *natural philoſophy* — to which of late have been joined the ſtudies of *rational theology*, *chemiſtry*, the *philoſophy of hiſtory*, the *hiſtory of man* and the *ſcience of politics*.

This very brief and imperfect outline of the progreſs of human learning, will nevertheleſs ſufficiently illuſtrate my meaning reſpecting the injury which phyſiognomy has ſuffered from a fortuitous connection with exploded literature. Nothing is more common among mankind than the haſty rejection of valuable opinions from their artificial or accidental connection with other opinions untenable and abſurd. The hiſtory of theology in particular, and the preſent complexion of theological opinions in Europe, furniſh a pregnant inſtance of the truth of this remark. It will therefore be ſufficient for me to obſerve at preſent, that during the ſpace of about one hundred and fifty years from the commencement of the ſixteenth century, the authors on the ſubject of phyſiognomy were very numerous; and that very many, if not the greateſt part of them, treated expreſsly as ſubjects of importance either magic alchemy, the doctrine of ſignatures,

tures, aſtrology, or the theoſophic philoſophy. Nor is it any wonder that phyſiognomy ſhould fall into contempt when the prevalence of more rational literature rejected its cotemporary ſciences. Some few facts and obſervations reſpecting this part of the literary hiſtory of phyſiognomy, illuſtrative of its temporary connection with the doctrines above mentioned, I ſhall, with the permiſſion of the Society, throw into the form of an illuſtration or appendix to this eſſay, becauſe they are in my opinion not altogether unworthy of notice, but would form a digreſſion too long for the paper itſelf.

Excepting that phyſiognomy was faſhionable among the authors who treated on the abſtruſe ſciences above mentioned, I do not recollect any thing peculiar reſpecting this ſtage of its progreſs. There were ſome authors indeed even during that period who treated it free from the abſurd conjunction of the prevailing ſubjects of the day, ſuch as Pere Honorat Nicquet and Claramont. But the obſervations even of theſe writers* are too general, indeterminate and conciſe, to be of conſiderable uſe; and appear rather, as the concluſions of theo-

* I judge from Gaſp. Schott, who has followed Nicquet, and from the quotation in Lavater from Claramontius.

retic

retic lucubration, than the well founded remarks of men converſant with the world. A ſufficient ſpecimen of the phyſiognomic writings of the time may be ſeen in the quotations which Lavater has ſelected.*

About the commencement of the eighteenth century and thence forward, the occult ſciences as they are called, had declined conſiderably in eſtimation; and the authors who noticed the ſcience of phyſiognomy forbore to diſgrace it by a connection with thoſe branches of ſuppoſed knowledge which had formerly been its companions. Among us Dr. Gwither noticed it with approbation in the eighteenth volume of the Philoſophical Tranſactions. † Dr. Parſons alſo choſe the ſame ſubject for the Croonean Lectures, publiſhed at firſt in the ſecond ſupplement to the forty-fourth volume of the ſame Tranſactions, and afterwards (1747)‡ republiſhed in Engliſh: but theſe as well as the cur-

* Vol. III. p. 243. French tranſlation, quarto.

† No. 20. Theſe remarks of Dr. Gwither are copied into Chambers's Dictionary and the Encyclopædia Britannica, but without reference. The importance of works of that kind would be increaſed tenfold by a proper reference to the writers and authorities made uſe of.

‡ Under the title of "Human Phyſiognomy explained."

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ſory obſervations in Lanciſius,* Haller† and Buffon‡ relate rather to the tranſient phyſiognomy of the paſſions, than the permanent features of the face and body; the well known characters of Le Brun, are alſo illuſtrative of the tranſient phyſiognomy.

Earlier however than theſe writers,‖ our Evelyn had inſerted a copious digreſſion on the ſubject, in his *Numiſmata*, a Diſcourſe on Medals; in which there is a panegyric on the ſcience, with ſeveral practical remarks and miſcellaneous obſervations. Among the reſt, is an analyſis of the countenances of many great men whoſe characters were known. It does not appear however to contain upon the whole any thing worthy of peculiar notice.

The ſubject ſeems to have been attended to now and then during this century, but I do not find any thing remarkable concerning it, till the diſcuſſion already mentioned, in the Berlin Tranſactions§ between M. Pernetty and M. Le Catt.

* The Medical and Anatomical Works of Lanciſi were publiſhed in 1718, in which there is a letter on the ſubject of phyſiognomy, and ſome obſervations on the frontal muſcles.

† Phyſiologia, quarto, vol. V. p. 591.

‡ Hiſt. Nat. de l'homme. Etat virile.

‖ In 1697. § Vol. XXIV.

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This controverſy commenced with a diſſertation on the advantages and diſadvantages of phyſiognomy by M. Le Catt. In the ſucceeding volume, (the twenty-fifth) is an anſwer by M. Pernetty; to which follows a reply by M. Le Catt; and a ſupplementary reply by the ſame in the twenty-ſixth volume. This contains alſo three more diſſertations by way of rejoinder on the part of M. Pernetty. I have already noticed this diſcuſſion ſo far as it relates to the *definition* of phyſiognomy. The reſt of it, turned upon theſe two queſtions:

Firſt, Whether it would be advantageous or otherwiſe to ſociety, if each individual carried in his appearance, ſuch marks of his character, diſpoſition and talents, as would enable others to collect with certainty theſe latter, from the former.

Secondly, Whether on the ſuppoſition that the ſcience of phyſiognomy would enable us to diſcern a part only of the internal character, and mankind in general being but imperfect phyſiognomiſts, it would be advantageous to ſociety to cultivate the ſtudy of phyſiognomy.

Theſe queſtions were agitated, with more prolixity, than their importance to the ſubject of phyſiognomy in my opinion deſerved. No reaſoning *à priori* can poſſibly determine them with any degree of certainty. Time and experience alone will aſcertain what degree of influence

influence any particular kind of knowledge will have upon the manners and characters of mankind. In the mean time it is reaſonable to conclude from the analogy of every fact reſpecting human ſcience, that the *reſult upon the whole*, of attaining any portion of knowledge heretofore unknown, will not be otherwiſe than beneficial. Nor is it likely, that mankind will be *permitted* to attain any branch of knowledge, not ultimately conducive to the happineſs of the ſpecies. Indeed the ſame queſtions might have been agitated as preliminaries to every ſcience already known: and if the affirmative in ſimilar caſes, muſt be clearly eſtabliſhed, before we proceed to the inveſtigation of the ſcience itſelf, the courſe of human improvement might be ſtopt for ever.

During this controverſy, M. Pernetty laid it down as a principle, that no man can be a phyſiognomiſt, unleſs he receives a knowledge of the ſcience originally as a gift from the Deity: and that the faculty of phyſiognomizing, is not acquired, but innate. It is obvious to remark, that if M. Pernetty's opinion be well founded, it was mere waſte of time to diſcuſs either the queſtions before mentioned or any others relating to the ſubject; for, which ever way they might be determined, the exiſtence or non-exiſtence of phyſiognomy as a ſpecies of knowledge, not being optional

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to the perſons addreſſed, would not be affected by the determination. Such gratuitous and unphiloſophical aſſertions from the ſupporters of phyſiognomy, caſt a ridicule upon the ſcience itſelf; and induce mankind to aſſociate the idea of fallacy, even with the well-founded arguments of thoſe who advance them.* This remark however is not applicable to M. Pernetty alone.

Soon after this controverſy, appeared the great work of M. Lavater, dean of Zurich, which has excited no inconſiderable degree of attention in the literary world. The magnificence of the work itſelf, and the ſuppoſed viſionary nature of the ſubject treated, has contributed not a little to make it generally known.† Indeed, ſo far as I am able to judge, it is (with all its faults) the moſt important book on the ſubject, ſince the days of Ariſtotle. Senſible that the ſcience is

* M. Pernetty alſo ſomewhere intimates that a phyſiognomiſt to form a good judgement, ought to have the diſpoſitions of the perſons phyſiognomized, an opinion, ſo obviouſly unfounded that it is ſtrange its abſurdity did not ſtrike him at once.

† The German edition of M. Lavater's Work (which I have never ſeen) was in four volumes quarto. Since this Eſſay was written, the third volume of the French Tranſlation has appeared, and I have therefore altered my original account of M. Lavater's book by referring to it.

yet in its infancy, M. Lavater profeſſes to give, not a complete, ſynthetical treatiſe on phyſiognomy, but fragments only, illuſtrative of the different parts of this branch of knowledge; and it muſt be confeſſed that his performance, however deſultory and unconnected, is in many particulars much ſuperior to thoſe that have preceded.

In conformity with his deſign, he has rejected the ſcholaſtic, ſyſtematic method ſo common among the phyſiognomiſts of the laſt and preceding centuries, and with it he has rejected alſo their manner of writing, dry, conciſe, indeterminate, and general: the remarks of M. Lavater on the contrary, are for the moſt part, preciſe and particular; and frequently founded on diſtinctions extremely acute.—He has omitted entirely (as indeed might reaſonably be expected from a writer of the preſent day) the aſtrological, and ſimilar reveries, ſo diſgraceful to the writers of the generality of his predeceſſors.—He has (with great good ſenſe) very rarely deduced or confirmed his phyſiognomical remarks by anatomical or phyſiological reaſonings; which indeed, however important they may prove hereafter, ſeem even in this preſent advanced ſtate of our knowledge reſpecting them, an inſufficient foundation to ſupport particular obſervations.—He has purſued the method firſt adopted I believe by J. Baptiſta

Baptiſta Porta* of illuſtrating his remarks, by engravings, extremely numerous, oftentimes expreſſive, and upon the whole, tolerably executed even for the taſte of modern times.

Nor are theſe variations from the generality of the authors who have gone before him in the ſame track, the only particulars which juſtly entitle M. Lavater's work to a pre-eminence among the books on this ſubject. His opinions are more evidently the reſult of actual obſervation than thoſe of preceding phyſiognomiſts. He appears alſo to have made the ſcience more peculiarly his ſtudy than any other perſon; and (excepting indeed his profeſſion as a divine) it ſeems to have been the grand purſuit of his life. His attention moreover to *oſſeal* phyſiognomy, and the effect of *profiles* and *contours*, evince a comprehenſion of the ſubject, much ſuperior to what appears in thoſe who have treated it heretofore. And in addition to theſe, his ſtile, though ſomewhat declamatory and digreſſive, yet forcible and lively; his expreſſions, frequently preciſe and characteriſtic; and the ſpirit of piety and benevolence which pervades the whole of his performance, contribute not a little to render it highly intereſting.

* The Italian edition of Baptiſta Porta's Phyſiognomy, is ſaid to have the beſt cuts.

With all theſe good qualities however, M. Lavater's work has faults that take away conſiderably from the deference which his phyſiognomical opinions would otherwiſe have claimed. And his imagination has in many inſtances, ſo evidently gotten the better of his judgment, that a reader who ſhould take up his volumes for the mere purpoſe of amuſement, would be ſtrongly tempted to reject the whole ſyſtem, as the fanciful conceit of an ingenious but extravagant theoriſt.

Among the objectionable parts of his book are the following:

1. The myſterious air of importance, with which (like many of his predeceſſors) he has clothed his favourite ſcience, and deſcribed the whole of the material world as objects of her dominion.*

2. The fanciful neceſſity which he impoſes that a phyſiognomiſt ſhould be a well-ſhaped handſome man:†

3. His language very frequently too peremptory and deciſive; not warranted by the

* Vol. I. p. 33—38. Vol. II. p. 89. French tranſlation.

† Vol. I. p. 126.

ſubſtance

ſubſtance of his remarks, and diſproportioned to the occaſion.*

4. His remarks themſelves, in numerous inſtances unſupported by the illuſtrations, and ſometimes, apparently oppoſite to common obſervation.*

5. His too great reliance on ſingle features, as the foundation for deciding on a character.†

6. His premature opinions on the phyſiognomy of the ears, hands, nails and feet of the human ſpecies; on hand writing; on the phyſiognomy of birds, inſects, reptiles and fiſhes. On none of theſe can a ſufficient number of accurate obſervations have been made, to warrant the ſlighteſt concluſion.‡

7. His

* Inſtances of theſe I think will occur frequently, eſpecially on peruſing his Phyſiognomic Remarks on the illuſtrative engravings, but of theſe each reader will be the beſt enabled to judge for himſelf, until the ſcience ſhall put on a more ſyſtematic form, than the preſent collection of obſervations will permit.

† That there is ſuch a thing as homogeneity, and harmony of feature there is no doubt, but the inſtances of exception are ſo numerous, and the illuſtrative caſes ſo ſcattered and unarranged, that it appears to me injudicious preſumption in moſt inſtances, to decide poſitively on the obſervation of a ſingle feature.

‡ The old phyſiognomiſts who (in the ſpirit of the times) would in no wiſe have omitted to treat the ſubject *ſyſtematically*, were on that account induced to take into

 conſideration

7. His introduction of objects ſuch as the preceding, is the more ſingular, from the ſlight and inadequate attention he appears *hitherto* to have beſtowed, on geſture, voice, manner, and the important topic of national phyſiognomy. All of which he has indeed in ſome degree touched upon, but far leſs than facts might have warranted, or their importance demanded. *

8. The repeated introduction of his own face throughout the courſe of the work, and the ſingular remarks he makes on it, although his character may fully juſtify the truth of them, do not ſerve to prejudice the reader in favour of his judgment. †

9. The ſame obſervation may be made on his ſingularly fanciful Theory of Apparitions,

conſideration every part of the body in its turn. But the manner of M. Lavater, profeſſedly deſultory, did not lead him to this; and he has even exceeded the faults of predeceſſors, by the introduction of phyſiognomical obſervations, on the hand writing, on inſects, &c. which the preſent ſtate of phyſiognomy is very ſhort indeed of being ſo far advanced as to include.

* What the fourth volume will include we cannot yet ſay; but from the ſhort *proſpectus* of the ſubjects, which the editors give in the preface to the third volume, the topics mentioned in the text do not ſeem to be ſufficiently included in the plan.

† Vol. II. p. 201, 202, 203, 204: with theſe compare vol. II. p. 8. and vol. I. p. 14, 166.

which

which goes near to a revival of the old opinions of the ſympathiſts.*

10. To theſe may be added the general character of enthuſiaſm in favour of phyſiognomy, which is ſtampt on every page of the work, and to which indeed a great part of the merit of it may be due. But it certainly has the ſalutary tendency of ſetting his readers on their guard againſt a too precipitate admiſſion of his phyſiognomical deciſions.

Such appears to me the character of a work which altogether does credit to the times as well as to the author.

M. Lavater's book produced an attack upon it, from M. Formey, in the Berlin Tranſactions for the year 1775. M. Formey having diſcuſſed the propriety of the extenſive ſignification given to the term phyſiognomy by M. Pernetty and Lavater, adopts a definition nearly the ſame with that which I have taken. He allows that every fibre of the body influences and is intimately connected with the mental character; but he urges, as his principal argument, that our frame is liable to ſo many accidents by which it may be altered or modified,

* Vol. III. p. 164. The ſubſtance of M. Lavater's hypotheſis, Dr. Feriar has already quoted in Eſſay on Popular Illuſions. M. Lavater's own opinion of it is curious. *Nous parviendrons à etablir un hypotheſe, digne d'occupée un des premiers rang dans la claſſe des probabilités philoſophiques!*

that have no connection with the diſpoſition or talents of the perſon who may be expoſed to them, that it far ſurpaſſes human ſkill to diſtinguiſh between ſuch modifications of feature as are, and ſuch as are not connected with the mind; and therefore although there may be truth in the ſcience of phyſiognomy, the Deity alone can be a phyſiognomiſt. He obſerves moreover that our caſt of features is liable to be determined by the temperaments of our anceſtors lineal and collateral, by education, by diet, by climate, by ſudden emotions, &c. ſo that the determination given to our features by our mental character, may be ſo involved with, or hidden by accidental circumſtances, that it is in vain to attempt the ſtudy of a ſcience whoſe limits are ſo confined. Theſe objections of M. Formey are worth noticing, although they do not ſtrike me as concluſive on the points toward which he urges them.

Beſide this Eſſay by M. Formey, I know of no other ſubſequent publication of any moment on the ſubject. From this hiſtorical deduction however of the literary progreſs of phyſiognomy, it appears that in whatever diſrepute the ſcience may now be fallen, there is ſcarcely a period to be mentioned wherein any thing of ſcience was known, in which phyſiognomy had not its abettors and its profeſſors among men of the

the greateſt learning and moſt undoubted abilities; and that in all probability the chief reaſons why ſo little attention is paid to the ſubject at preſent are

Firſt, That it has been treated in conjunction with ſubjects, now properly exploded as unworthy of attention; and ſecondly, That it has been injured by the injudicious aſſertions and arguments of thoſe who have undertaken its defence.

The learned and the wiſe however may ſometimes be miſtaken; nor ſhould any deciſive concluſion be drawn againſt the uſe of any thing, from its having been abuſed. The time therefore may not be far diſtant, when phyſiognomy will be reinſtated in her rank among the valuable branches of human knowledge, and be ſtudied with that degree of attention and perſeverance, which a ſubject deſerves, ſo eſſentially connected with the ſcience of man.

APPENDIX.

OBSERVATIONS *on the* TEMPORARY CONNECTION *of* PHYSIOGNOMY *with the* OCCULT SCIENCES.

A PROPENSITY to the marvellous has usually been considered as the result of ignorance; and properly, if ignorance be compared abstractedly with knowledge. But there have been periods in the history of human literature, when superior genius and superior attainments have given rise to this taste for the wonderful, and induced mankind to believe in proportion to the want of evidence. The dawn of science in almost every period and nation, has tempted its votaries to advance much farther into the regions of conjecture and hypothesis, than the number or importance of the facts discovered could authorize; and thus, struck with the novelty of the scene, the learned and the curious have adopted with credulous alacrity, the delusive phantasies of imagination, for the genuine offspring of knowledge and experience.

The revival of literature in Europe a few centuries ago, furnishes sufficient proof of the preceding observation. The spurious sciences of astrology, magic, and alchemy; the exploded doctrines of signatures and sympathies, and the motley jumble of the rosicrucian and theosophic philosophy enjoyed their respective periods of fashionable attention. Physiognomy too was regarded as of the same family and treated in consort with these branches of fantastic literature; so much, that some brief account of them may be fairly considered

conſidered as connected with the literary hiſtory of phyſiognomy.*

Aſtrology ſeems to have been taught as a ſubdiviſion of what we term aſtronomy from the time of the Chaldeans,† Egyptians,‡ Greeks,§ Romans‖ and Arabians¶ down till very late in the ſeventeenth century.** It is no wonder therefore that men ſhould be led away by prejudices of ſo long continuance, eſpecially when they were aided by what are now properly regarded as accidental coincidences of events, with aſtrologic obſervations; while the more numerous caſes of failure, which ſeemed to contradict the principles of the art, were attributed to the errors of the pen. The ancient name for aſtronomy itſelf, eſpecially among the Romans, was aſtrology, and the profeſſors were named indiſcriminately Chaldeans, Genethliacs, Aſtrologers, Mathematicians and Babylonians;†† and in all probability the phyſiognomiſts and genethliacs who abounded under the emperors, were for the moſt part the ſame perſons, ſince in thoſe times phyſiognomy and aſtrology were both ſpecies of the *ars divinatrix*. During the middle ages, aſtrology was now and then cultivated in Europe, and ſeems to have been more in vogue than the *illicit* ſpecies of divination commonly called magic: the latter had the prejudices of all good chriſtians to encounter, whereas the former was regarded as an allowable application of ſuperior knowledge, and is mentioned even by Thomas Aquinas, in terms rather of approbation than

* A great deal of what I had intended to include in this appendix, Dr. Feriar has ſo well ſaid in his paper on Popular Illuſions, that I ſhall be very brief on thoſe ſubjects which he has touched.

† Cic. de div. lib. II. Aul. Gell. lib. I. c. 9. and lib. XIV. c. 1.

‡ Cic. de div. lib. I. num. 93. § conſule loc. cit. ‖ ut ſupra.

¶ Golius in Alfragan, p. 253. ** Voſſ. de Philoſoph.

†† Beſide the paſſages before cited, ſee Not. Gronov. in Aul. Gell. lib. XIV. c. 1. Jul-Firm.

reproof.

reproof.* The ſixteenth and ſeventeenth centuries however, were of all others the moſt prolific in aſtrologers and aſtrological treatiſes. Nor was the ſcience confined to ſuch perſons as Aulus Gellius† terms "*Æruſcatores*" who like the Egyptian Chiromancers of the preſent day, merely ſtroled about to procure a ſcanty and precarious ſubſiſtence by impoſing on the credulity of the ignorant; on the contrary it was cultivated and recommended by perſons of the firſt learning and abilities and of the higheſt literary reputation. It is ſufficient for my preſent purpoſe to notice, that the majority of thoſe who have been mentioned as authors of repute on the ſubject of phyſiognomy have treated alſo diffuſely either on aſtrology in diſtinct treatiſes, or on aſtrology as connected eſſentially with phyſiognomy or chiromancy. Indeed this latter branch of phyſiognomy is ſcarcely ever treated but aſtrologically, each part of the hand being aſſigned to a particular planet. Moreover phyſiognomiſts have not only called in aſtrology in aid of their ſcience, but aſtrologers have themſelves alſo frequently applied aſtrology to phyſiognomy; the ſame ſtars in the ſame ſituations and aſpects denoting (according to them) with every corporature a certain turn of mind.

There is a paſſage in Strype's Life of Sir John Cheke, which ſhews very forcibly the prevailing taſte for aſtrology at that time. "Here then we leave Sir John Cheke, a "diſconſolate priſoner in the tower now the ſecond time "under queen Mary, to repent of his credulity to the "words and promiſes of romaniſts, and his too much con-"fidence in aſtrology, whereby he is impoſed upon to his "deſtruction..... This art of conjecturing at or foreknow-"ing things or events by the poſition of the ſtars was about "theſe times exceedingly ſtudied, by both nobility and "gentry. Inſomuch that Dr. Lawrence Humphrey (who "lived in thoſe days and was afterwards a learned profeſſor "of divinity at Oxford) in a book which he wrote for the

* See the Index to his Summa ſub voce Aſtrologia. † Ubi ſup.

"uſe

" uſe and inſtruction of the gentry, exhorting them to the " ſtudy of divers ſciences, obſerved how much this ſcience " above the reſt was ſo ſnatched at, ſo beloved, and even " devoured by moſt perſons of honour and worſhip, that " they needed no incitements to this but a bridle rather: " not a trumpeter to ſet them on but a reprover to take them " off from their heat," p. 138, Ann. 1556. See alſo to the ſame purpoſe the lives of Lilly and Aſhmole, and Dr. Johnſon's life of Dryden. Dr. Joſeph Wharton in the firſt volume of his Eſſay on Pope obſerves that Sir Iſaac Newton in the former part of his life was addicted to judicial aſtrology.

Aſtrology then, appears to have flouriſhed at the ſame period with phyſiognomy, to have been treated by the ſame authors, and to have been regarded as eſſentially connected with phyſiognomy; the diſgrace of the former therefore, could not but affect the reputation of the latter.

The ſame obſervations, but in a degree ſomewhat leſs extenſive, may be applied to *magic*. This ſcience (if it may be ſo called) ſeems to have been in vogue among every people civilized and uncivilized and in every period, from the Egyptian magicians Jannes and Jambres, and the witch of Endor, through the claſſical period of Roman literature, and down to the more technical magicians of the ſixteenth and ſeventeenth centuries.

The ſcriptural magicians, as well the witches of Horace, Virgil and Lucan,* appear to have been chiefly if not entirely necromantic; but the refinement of the period juſt mentioned has produced a variety of deviſions and ſubdiviſions of the ſubject, which will of themſelves ſufficiently ſhew the great attention paid to magic at that time.

Magicians are diſtinguiſhed † into diviners with, or without communication or conjuration of ſpirits. Magic

* The proceſs is very minutely deſcribed in Lucan, lib. VI.

† I owe a part of this enumeration to my deceaſed friend John Henderſon of Pembroke College, Oxford.

of

of the firſt kind (i. e. by the help of ſpirits) is either 1. when a ſpirit voluntarily attaches itſelf to a man—this is indifferent; 2. when a man conjures them, either without compact, which is held indifferent, or with compact, which is evil if with evil ſpirits; though indeed moſt condemn all kinds of conjuration. 3. By divine commiſſion, as in the caſe of the prophets, apoſtles, &c. this of courſe is held good.

Magic of the ſecond kind (i. e. without ſpiritual communication) is either 1. The working of wonders, which may be præſtigia, leger de main, ſtrange experiments in phyſics. 2. Divining from natural ſignatures, or 3. from the ſtars (i. e. aſtrology), or 4. ſortilegy, which includes the divination by chances of all kinds, Geomancy, Coſkinomancy, Clidomancy, &c.

The voluntary attachment of ſpirits (to which may be referred the ſecond ſight) was commonly deemed unfortunate, and all magic but the divine, unlawful.

The conjuration by means of ſpirits was fourfold: I. Necromantic, when either 1. an appearance of a dead perſon is raiſed; or 2. when a ſpirit is forced into a dead body. II. By circulatory invocation, when at due aſtrological hours and with proper ceremonies ſpirits are made viſible round a circle. III. By opening a conſecrated book on the name of the ſpirit wanted. IV. By calling at a ſign a compacted familiar; this laſt is uſually termed witchcraft.

To theſe may be added the conſecrated glaſs or cryſtal in which, on invocation, may be ſeen the perſons or things required; the operations on the bodies of abſent perſons by means of images of wax or clay;* and that ſpecies

* This iconopoietic part of magic ſeems founded on the doctrine of ſignatures.

of

of witchcraft which is employed to counteract the malicious designs of those who injure others by the assistance of a familiar; persons who profess this are in England termed *white witches.**

During the period so often mentioned (the sixteenth and seventeenth centuries) this pretended science was commonly received, and by many eagerly studied. The books published respecting it were numerous, and among the learned who gave credit to it were some of the first names that literature could boast. So prevalent indeed was the belief in magic, that there are few European nations whose criminal code does not enumerate the practice as an offence.† What is particularly however to the purpose here, is that many authors of note on the subject of physiognomy, treated also on magic both natural and supernatural, such as Baptista Porta, Schottus, Alstedius, Campanella, Cardan, Paracelsus, Fludd, &c. a part therefore of the disgrace to which physiognomy has been exposed may be attributed to this circumstance among others.

The same period of the fifteenth and sixteenth centuries, abounded also in *alchemists* and *alchemical writers*. The present state of chemical knowledge induces us to conclude with great probability that the researches of the alchemists

* The exhibition of absent persons by a consecrated glass is among the fancies in Dr. Dee's Works; the fourth book of Cornelius Agrippa's Occult Philosophy, is on the combined plans of the consecrated book and circulatory invocation; the various kinds of divination may be found in the same author's treatise *De vanitate scientiarum*, in which physiognomy is enumerated among the divinatory arts.

† The instructions for examining a witch in Dalton's Country Justice, p. 318, are too long to be inserted here but are extremely well worth perusing.

concerning

concerning the philoſopher's ſtone, or powder of projection which was to turn all baſe metals into the noble ones, and concerning the grand elixir, or univerſal medicine* which was to procure a perpetuity of life, did not ſucceed. The more likely theory which muſt account for the facts related is, that in many inſtances they deceived themſelves, and that ſome of them wilfully deceived others. Of all the branches of natural philoſophy there is none ſo engaging as chemiſtry. The vaſt extent of the ſcience, the variety of unexpected phenomena it produces and explains, the number of uſes it poſſeſſes, and the ſuperior ſtock of real knowledge it affords to thoſe who cultivate it, are circumſtances that would operate ſtill more ſtrongly in the infancy of the ſcience, than even at the preſent day. Nor is it at all ſurprizing that appearances ſo wonderful approximating ſo nearly to an abſolute creation of one ſubſtance out of another, as the revivification of an ore, a calx, or a ſolution, into the brilliancy of a perfect metal, ſhould induce the votaries of the ſcience to extend their hopes very far beyond the ſcanty limits of their actual knowledge. As Kepler remarked of aſtrology† that it was the fooliſh daughter of a wiſe mother, ſo alſo may it be ſaid of alchemy. To the vain ſciences, however, of aſtrology and alchemy, are we indebted for the preſent advanced ſtate of aſtronomy and chemiſtry.

Rouſſeau ſomewhere remarks that a true philoſopher has frequent occaſion to ſay *J'ignore*, but very ſeldom ventures to pronounce *c'eſt impoſſible*. This remark in my opinion will

* The grand elixir or univerſal medicine, among the earlier alchemiſts ſeems to have been no more than a figurative expreſſion for the philoſopher's ſtone, becauſe this latter cured all the (metallic) diſeaſes of the imperfect metals, and purified them into the perfect and indeſtructible metal gold. About the time of the origin of the Roſicruſian fraternity, and after the writings of Van Helmont, it appears to have been conſidered literally as a medicine.

† Præfat. ad Tabul. Rudolphin, p. 4.

apply

apply to alchemy. It is as I have said before, highly probable that the old alchemists either meant to deceive their readers, or were deceived themselves: but after the solemn protestations which many of them have made (without any apparent motive to deceive) of their having succeeded in the *confectio lapidis*; after the high praises given to their fidelity in other respects by Boerhaave, and his caution on this subject in particular;* after the hesitation of the illustrious Bergman himself;† and the possible conclusions deducible from the modern doctrine of metallic acids, and the coagulating and metallizing portions of phlogiston, and after the inexplicable fact (among others) of the fixation of mercury in the experiments of the late unfortunate Dr. Price,‡ a chemist even in the present state of knowledge may say without ridicule concerning some of the alchemical assertions on this subject, *J'ignore*. But whatever might have been the good or ill success of the alchemists in their pursuit after the grand arcanum, the expectation of success, joined with the novelty of the phenomena that occurred in the course of their experiments, seems

* Boerh. Chem. part II. sect. "On the usefulness of chemistry in alchemy:" which contains the best general summary of the doctrines of the alchemists that I recollect to have seen.

† Hist. Chem. Med. Ævi. § 2.

‡ "An account of some experiments on gold, silver, and mercury, made at Guildford in May 1782, in the laboratory of James Price, M. D." I take for granted the truth of the *facts* as there related, which indeed cannot be disputed considering the respectability of the persons present, without the most gratuitous scepticism: and on that supposition, whether the gold and silver were formed, or whether they were merely precipitated from the mercury, the exhibition of these two former metals under the circumstances, ranks among the most curious, the most inexplicable facts of ancient or modern chemistry. The gratuitous, unfounded, and I may say ungenerous supposition, that a person of Dr. Price's knowledge, rank and character should so absurdly be guilty of wilful and puerile charlatanery, is to me full as inconceiveable as any explanation of the matter hitherto

seems to have attracted a great number of followers from a very early period. Suidas* mentions that the Emperor Diocleſian ordered all the books of chemiſtry to be burned, leſt the Egytians learning from them the art of peparing gold and ſilver ſhould thence derive reſources to oppoſe the Romans. Pope John XXII. in the fourteenth century,† thought fit to ſtigmatize the alchemiſts as impoſtors. In England the ſtudy was ſo much in vogue that the ſtat. 5 Hen. IV. Ann. 1504 makes it felony to uſe the art of multiplying gold and ſilver.‡ In the 35 Hen. VI. however letters patent were granted to ſeveral people, whereby they were permitted to inveſtigate an univerſal medicine, and to perform the tranſmutation of other metals into gold and ſilver, *non obſtante* the former ſtatute;‖ this laſt ſtatute remained in force till 1689, when it was repealed (as is ſaid) through the private intereſt of Mr.

hitherto given, can be: nor indeed has any one yet preſumed to conjecture at the mode of deception; nor was it ever till that time conceived that mercury uſually did or even could, bring over with it in ſublimation ſo large a proportion of gold *and* ſilver. That a perſon of Dr. Price's accuracy ſhould refuſe to publiſh a proceſs ſo extraordinary, till he had aſcertained it by experiments ſcrupulouſly *repeated*, I can eaſily believe; and that not ſucceeding in the repetition of an experiment ſo anxiouſly expected, and in which his reputation was ſo much involved, a perſon of his known high ſpirit ſhould too haſtily have recourſe to ſuicide as a means of avoiding general diſgrace, carries with it nothing violently improbable. Caution in giving credit to any thing very extraordinary is certainly a mark of good ſenſe; but the ſpirit of incredulity, is of all other ſpirits the moſt oppoſite to the ſpirit of philoſophy.

* Suidas voce χημεια. Watſon's Eſſays, vol. I. p. 14.

† In the Bull *Spondent quæ non exhibent*, &c. Bergman Hiſt. Chem. Med. Ævi. § 1. Kircher Mund. Subter. lib. XI. ſect. 4. cap. 1. Watſon vol. I. p. 22.

‡ Watſon ubi ſup. ‖ Ibid. p. 24.

Boyle.

Boyle.* The faculty of medicine at Paris had alſo condemned alchemy in the year 1609.†

The fallacious experiments however of the later alchemiſts; the methods they introduced to deceive the credulous‡ and defraud them of their property; the myſterious and affected language in which they delivered their inſtructions; the connection of the alchemical doctrines with the roſicrucian and theoſophic jargon; and the general prevalence of more rational philoſophy and more accurate chemiſtry, contributed to bring them into diſgrace, and opened the eyes of their readers to the vanity of their pretentions.

The diſgrace of alchemy, has of courſe affected its conſort ſciences; among theſe phyſiognomy muſt be reckoned, for Hermes Triſmegiſtus, Rhaſis, Avicenna and Albertus Magnus, rank among the phyſiognomiſts as well as the alchemiſts; ſo alſo do the theoſophers Paracelſus, Fludd and Behmen. Moreover, both alchemy and phyſiognomy have been treated as equally real ſciences by Porta, Schottus, and Alſtedius, and indeed by the generality of popular compilers of the times.—The ſame accuſation therefore which may be laid againſt magic and aſtrology with reſpect to phyſiognomy, will apply alſo to alchemy.

Among the other ſingular opinions of the æra in queſtion, was the *Doctrine of Signatures*. This was of two kinds: ſome philoſophers holding that plants and minerals, and even animals (particularly the former) had marks or ſignatures impreſſed by the hand of nature, indicating the therapeutic uſes to which the things themſelves might be applied; while the theoſophic myſtics (comprehending al-

* Ibid. and Life of Boyle prefixed to the folio edition of his Works, p. 83.

† Bergman ubi ſup.

‡ Such as having hollow ſpatulas to ſtir the mixture, and concealing gold in the hollow part; having falſe linings to the crucibles; uſing lead or mercury containing a ſlight amalgam of gold; concealing gold in the cover or the luting, uſing charcoal moiſtened with a ſolution of gold, &c.

moſt all the chemical philoſophers of the day), went ſtill farther, and adopted the notion that every ſubſtance in nature, had either external ſignatures immediately diſcernible, or internal ſignatures which fire or menſtrua alone would bring to view, denoting its connection with ſome ſidereal or celeſtial archetype.

The latter diviſion will of courſe rank among the reveries of the theoſophiſts whom I ſhall notice preſently. The former, almoſt as fanciful, and to the full as unfounded, was an opinion adopted by a very large claſs of literati who did not fall into the other notions of the myſtics. Indeed the doctrines of ſignatures in this ſenſe, can hardly be conſidered as originating in this æra; traces of its adoption being to be found among the writings of ſome of the wiſeſt of the ancients: thus Pliny the elder* mentions the marble *ophites*, ſo called from its being ſpotted like a ſerpent, as ſovereign againſt the bite of that animal, and the *hæmatites* or blood-ſtone, as a remedy for hemorrhage.

In aſcertaining the ſuppoſed medicinal effect indicated by theſe imputed reſemblances, the philoſophers of the period in queſtion do not ſeem to have been very ſcrupulous. Among plants for inſtance, ſome were valued for their reſemblance to certain parts of the body, and regarded as univerſally good againſt the diſeaſes of thoſe parts; ſuch as the roots of ſquills, walnuts, cucumber, &c. for diſorders of the head; liverwort for thoſe of the liver: dentaria, for the teeth: orchis, ſatyrion, &c. as aphrodiſiacs: while others were deemed efficacious againſt particular complaints, on account of their reſemblance to the diſorder itſelf as pilewort, againſt the hemorrhoids: the echium or ſcorpioides, the ophiogloſſum and the ophioſcorodon were preſcribed as remedies againſt the venomous bites of theſe animals on account of ſome fancied ſimilitude to ſcorpions and ſerpents; while the aconite and other poiſonous plants were

* Hiſt. Nat. lib. XXXVI.

recommended

recommended in similar cases, because one poison was thought to drive out another.

In the present state of knowledge, we smile at the advancement of opinions so slightly founded and conclusions so illegitimate; and are apt to despise without much investigation the notions of those who could seriously propound such fanciful absurdities. Unluckily for physiognomy, her votaries were among the foremost in defence of these doctrines which may be seen in their full extent in the writings of J. Baptista Porta and Crollius: not to mention the treatises on the Signature of Things by Paracelsus and Jacob Behmen, where similar notions are advanced in conjunction with the reveries of alchemical and mystical theology, and physiognomy itself is treated at length by the former as a branch of the philosophy of signatures. Among other physiognomical writers also who have supported this doctrine of signatures, may be reckoned Cardan* Campanella† and Alstedius.‡ The first rule in the Medicina Chemica of the latter is as follows. Reg. 1ª. Signaturæ rerum faciunt plurimum ad indagandas vires medicamentorum. *Audiamus hâc de re Duncanum lib. IV. de Therapeutica cap. VIII. Præterea in quit ad explorandas et indagundas vires Medicamentorum, Paracelsus novam quandam Physiognomiam et Chiromantiam excogitavit, et ex signaturis rerum occultas vires mœniendas esse putavit. Nam authore Paracelso (libro de signaturis rerum, et libro de Perficaria) natura omnia signavit et latentes vires cutis signis expressit nobisque manifestavit. Signaturæ autem aliæ externæ sunt, ut forma figura lineamenta et similia: aliæ internæ, spagiricâ et artificiosâ preparatione introductæ; veluti quæ partis similitudinem habent ei potissimum conferunt, ut hepatica hepati; euphrasia oculis; haliacabum vesicæ; pulmones vulpis, pulmonibus, &c. item lapidosa, et quæ lapidosum*

* De Subtilitate. lib. VII.

† De Sensu Rerum et Magiâ. Gaffarel Curiositates in auditæ. cap. V.

‡ Encyclop. fol. vol. II. p. 571.

quid proferunt (ut Saxifragia), calculo; herbæ perforatæ, ut hypericon, vulneribus. So also in another place* he lays it down, *omnis planta suam ipsius insitam virtutem, certo et infallibili signo ostendit homini.* Alsted is sufficient authority for the opinions of his day, as his compilation was in great vogue and really possessed great merit. It was no small praise that Leibnitz thought so well of the work, as to have entertained at one time an intention of revising and republishing it. When notions like the preceding came subsequently to be rejected, it is no wonder that physiognomy thus artificially connected with them should be rejected also. †

Of the still stranger doctrine of *sympathies*, I have little to say; partly because I do not find any writer expressly physiognomical who has treated on the subject, except Goclenius; and partly because Morhoff's Chapter de qualitatibus occultis, ‡ together with the observations of Dr. Ferriar on this head in his paper on Popular Illusions will furnish sufficient information. The theosophers however, in this as in the doctrine of signatures extended their

* Ibid. lib. XIII. Phys. part V. cap. 2.

† Boyle seems to have adopted the signatural opinions from his favourite authors the chemical (or rather alchemical) philosophers. Thus in his treatise entitled "Some Considerarions touching the Style of the Holy Scriptures," he says, "And as chemists observe in the Book of Nature, "that the simples that wear the figure or resemblance (by them termed "*signature*) of a distempered part, are medicinal for that part of that "infirmity whose signature they bear, so &c." It is upon this signatural principle I presume, that among his medicinal experiments he so often prescribed horse dung for the colic; album græcum for the hemorrhoids; sheeps bladders for the diabetes; the application of fresh blood in erisipelas; turmeric, saffron and fresh sheeps dung in the jaundice; dead men's bones for the ague, &c. The doctrine of signatures was not peculiar however to the chemical philosophers, for Porta Crollius and Cardan cannot be reckoned among them; and the same notion was adopted by Dr. Henry More, the opponent of the chemists. See his Antidote against Atheism, book II. chap. 6.

‡ Polyhist. tom. II. lib. II. part II. cap. 8.

notion

notion of the ſubject far beyond the mere medicinal application of it, including under the denomination of ſympathy the conſent or connection between celeſtial and terreſtrial objects. Indeed, the term itſelf has been variouſly applied; as 1. to the cure of wounds by the application of ſome medicinal ſalve or powder (called weapon-ſalve or ſympathetic powder) to the inſtrument which inflicted the wounds: 2. to the ſuppoſed cure of diſeaſes by means of the magnetic effluvia: 3. to the influence beneficial or otherwiſe of certain plants over others growing within their reach; to the poiſonous effect of this kind attributed to aconite for inſtance, and the antipathy of the oak and the olive: 4. to the unknown (but ſuppoſed real) connection between certain plants and artificial preparations of their produce, as the fermentation of wines when the vine flowers: 5. to the indirect affection of one part of the body when another diſtant part is immediately affected, without any apparent direct connection; as the ſtomach and the uterus: this is the modern medical doctrine of ſympathy, and was not unknown at the period in queſtion: 6. to the connection between certain remedies and particular parts of the body, as cantharides and the bladder: this is the doctrine of ſpecifics which ſo far as it is not ſignatural, and facts warrant it, may be admitted: 7. to the connection between celeſtial and terreſtrial ſpheres and orders of beings and to the mutual influence between human and aſtral bodies; the influence of the former over the latter being the ground-work of magic according to the theoſophers; and of the latter over the former of aſtrology: 8. to the influence of maternal imagination over the fœtus; a ſubject that deſerves more conſideration than has hitherto been given it: 9. to the communication of hyſterical and hypochondriacal diſeaſes by their effect on the imagination of the beholder; which appears to be frequent among the caſes of ſuppoſed affection by animal magnetiſm in our time: 10. to the effect produced by the talents, paſſions and

dispositions in the form, and features of the human species. The modern *ethical* application of this doctrine, to the subject of compassion, or the generation of moral sentiments I have nothing to do with. Hence the doctrines of signatures and sympathies appear to have been in many cases intimately connected, the former in such cases being considered as the exponent of the latter. To the doctrines of signatures and sympathies are owing in my opinion, the uncertain and popular notions of the efficacy of amulets and specifics, and the effect of the mother's imagination and inclinations on the fœtus. It is not uncommon for the absurdities of the learned in one century to become the current opinions of the vulgar in another. *

I proceed now to notice some few circumstances respecting that singular class of mystics † usually known by the appellation

* The Pythagoro-platonic cabalists, at the head of whom with us was the learned and excellent Dr. H. More, were almost as fanciful as the theosophic mystics. His Discourse on the Immortality of the Soul contains a strange collection of absurd relations. See that discourse for instances of signatures on the fœtus, out of Fienus and Sennertus, book III. chap. 6; and in chap. 13. there are some remarks on the sympathy between the earthly and the astral body, which More is almost inclined to adopt from Paracelsus. Mr. Boyle's medicinal receipts contain recommendations of amulets; and in his Treatise on the Usefulness of Philosophy, he strenuously insists on the sympathetic cure of wounds and the usefulness of the sympathetic powder both from his own experience and that of others. The sympathetic powder was usually some styptic, such as dyed green or white vitriol.

† Although among the *Pagans* may be reckoned as mystics; 1. the initiate into the mysteries; 2. the Pythagoreans; 3. the Platonists; 4. the Plotinians with Jamblichus and Porphery:—among the *Jews*; 1. the Cabalists; 2. the Platonists or Philonists; yet the term has usually been appropriated to certain sects since the introduction of, and professing *christianity:* as 1. to the first Gnostics; 2. the eclectic Gnostics; 3. the Asketics, Eremites and Monks; 4. the Theosophers, divisible into Paracelsians, Fluddists, Behmenists and Rosicrusians; 5. the disciples of Molinos (i. e. Quietists), Jansenius, Bourignon and Guion; 6. the Quakers, Bohemian brethren Hernhutters or Moravians, and the Methodists, whether Antinomian,

appellation of *Theoſophers* or *Philoſophers* by fire: at the head of whom ſtand Theophraſtus Paracelſus, Robert Fludd, and Jacob Behmen, phyſiognomiſts of no ſmall conſideration, who adopted with ſingular avidity, and propagated with perſevering induſtry, almoſt every ridiculous opinion which the extravagant philoſophy of the times had previouſly introduced; adding to theſe, various theories of their own fanciful production equally ridiculous and unfounded with the wildeſt notions of their ſpeculative predeceſſors. Somewhat like the gnoſtic chriſtians of old, they were eager to preſs their myſtic theology into an unnatural connection with their philoſophical reveries; and hence the motley aſſemblage of religion, alchemy, magic, aſtrology, &c. ſo ſtrangely united, and ſtill more ſtrangely delivered in the writings of this ſect.

Paracelſus, a native of Zuric in Switzerland, ſeems to have been the firſt who in the beginning of the ſixteenth century gave life and reputation to the theoſophic philoſophy; oppoſing with the greateſt violence the ſcholaſtic and metaphyſical doctrines of the literati of that time, and

Antinomian, Calviniſtic or Arminian; all of this claſs (like the preceding indeed) hold the neceſſity of ſpiritual regeneration (by many called the new-birth) or total change of heart and diſpoſition by the preternatural imparting of Divine Grace and immediate operation of the Holy Ghoſt, not merely ſuggeſting to the mind religious acts, but working divine habits in the ſoul. A doctrine not obſcurely delivered in the articles of the church of England. 7. The followers of Dr. H. More, Mr. Norris, &c. 8. the diſciples of Engelbrecht, Swedenborg, &c. beſides other claſſes of leſs obvious occurrence. The chriſtian myſtics may be divided into two general claſſes; 1. the purely theological, as the Aſketics of all kinds, Quietiſts, Quakers, Moravians, Methodiſts, &c. and 2. the philoſophico-theological, or thoſe who connect their own philoſophical theories with their myſtic theology, ſuch as the Gnoſtics and Theoſophiſts. Perhaps alſo under this claſs may be included the Swedenborgian and other ſimilar *viſionaries*. But however they may differ in their reſpective ſyſtems, immediate revelation and divine union is in general the connecting principle of their theology, and the analogy, reſemblance or connection of all ſpheres and orders of beings of their philoſophy.

abuſing

abuſing with equal virulence the Galenical practice of medicine, then univerſally prevalent. The increaſing tendency about that period to alchemical ſtudies, and the great ſucceſs which in certain caſes the chemical remedies of Paracelſus met with, procured him many followers both during his life and after his deceaſe. Early in the ſeventeenth century, Dr. Robert Fludd an Engliſh phyſician, and Jacob Behmen a German tailor (or ſhoe-maker) publiſhed their works, containing (ſo far as their meaning could be diſcovered) doctrines and ſpeculations very ſimilar in their general complexion and tendency to the dogmata of the Paracelſian philoſophy; but with variations of ſuch ſingular eccentricity, and with ſtyle and manner ſo perfectly anomalous, that I ſhould be ſtrongly tempted to give ſome farther account of the lives, tenets and dialect of theſe enthuſiaſts (each differing in ſome degree from the other), had not this appendix extended too far under my hands already.

To this claſs of philoſophers belong alſo the *Roſicrucian fraternity*, who firſt began to be noticed about the commencement of the ſeventeenth century, and profeſſed the ſame general opinions, and made the ſame theological and alchemical pretenſions to immediate revelation, the philoſopher's ſtone and the univerſal medicine with the Paracelſian theoſophiſts. They were ſaid moreover (whether truly or falſely has been doubted) to have framed themſelves into a myſtic ſociety, pretending, like the free maſons of modern times, to certain ſecrets as the bond of union divulged only to the initiate. The limits of this appendix, compel me alſo to decline any farther mention of this extraordinary ſect. Thoſe who wiſh for farther information on the general ſubject of the theoſophic myſtics (one of the moſt curious which the hiſtory of philoſophy affords, may conſult the very admirable work of Brucker* who with a

* Hiſt. Crit. Philoſophiæ. vol. IV. p. 644, et ſeq. and the authors there quoted. See alſo Moſheim's Eccleſ. Hiſt. vol. IV. p. 16, 264 and 476.

degree

degree of labour and ſkill to be appreciated only by an examination of the original authors, has collected together a ſet of propoſitions which may fairly be regarded as characteriſtic of the opinions of the theoſophic philoſophers, ſo far as the obſcure jargon of their principal writers will afford a glimpſe of meaning. This comparatively lucid expoſition of ideas that in Fludd and Behmen * particularly, eſcape all common reſearch, will not perhaps be unacceptable to the ſociety. The notions then, common to all the theoſophiſts are as follow.

1. All beings derive their origin from the divine eſſence, and are emanations from that infinite ſource; and hence every thing exhibits the Deity himſelf expanded to our view, and manifeſted in his creatures by different modes and ſtages of evolution.

2. Hence by a ſimilar order and ſeries of revolutions, all things thus originally evolved will return to their firſt ſource.

3. This is eminently true of the human ſoul, or that immortal ſpirit which dwells in the mortal body—this ſpark, derived from the boundleſs maſs of infinite light and united to man, ſtill retains ſome marks and properties of its origin, and will again return to that eternal center of Deity from whence it firſt proceeded—knowing therefore its origin, and the ſpring from whence it firſt flowed, it ſhould ſtrive to reaſcend; that with a pure and continual deſire

* Behmen in particular has had many followers in England, the famous Mr. William Law left a magnificent poſthumous edition of Behmen's works; a Mr. Taylor abridged them alſo for the uſe of Engliſh readers in a view of the Tuetonic philoſophy, and all Behmen's writings have been tranſlated into Engliſh, beſides Law's edition: neither do the modern Swedenborgians reject him. Godfrey Arnold in his Hiſt. et Apolog. Theologiæ Myſticæ ed. Francofurt. p. 597. ſays that Behmen's Treatiſe on the three Principles was tranſlated into Engliſh ann. 1648, at the expence of Charles I. and with the ſtrong approbation of Dr. H. More. Brucker's View of Behmen's Doctrine is taken from the two or three firſt pages of that work.

earneſtly

earneſtly ſeeking after its ſource, it may at length enjoy an union therewith, in ſilent acquieſcence and ſupreme delight.

4. Hence the bond of fleſh muſt be thrown off, and indulgence denied to corporal inclinations; nor ought the ſoul to be detained by or attached to the ideal diſquiſitions of REASON, but rejecting her deluſive inquiries, to be cleanſed and purified by penitence and reſigned ſubmiſſion, in prayer and interceſſion, piouſly expecting the divine illumination, and abſorbed in anxious deſire for its approach. That in this conſiſts true wiſdom, not to be learnt from the writings of Ariſtotle, or the philoſophy of the Gentiles, but from the internal and immediate illumination of the Holy Spirit; which muſt be waited for in the ſabbath of the ſoul, freed from the clog of all internal or external exertion.

5. This may be regarded as the more certainly true, ſince God, the fountain of all things, hath not only ſo impreſſed the likeneſs of his eſſence upon the human race, that man reſembles it in all its attributes, and (when duly cultivated and diſpoſed), in the inmoſt receſs of his ſoul can behold and contemplate it; but he hath moreover ſo communicated that likeneſs to every ſubſtance and creature, that when once we have attained to a knowledge of the Deity by an inward contemplation of his image, we may look downward from thence to the types and ſignatures of created beings and comprehend the wonderful bond of union, and mutually-communicated operation and influx by which all orders of exiſtence are connected.

6. In the knowledge of this connection and divine influx upon inferior beings, and of the rank and power of the divine emanations, conſiſts *natural magic*; which whoever hath learnt, is able to exerciſe authority, not only on the elements, but on the mundane ſpirits which preſide over them; to produce wonderful effects; to diſcover hidden myſteries, and to penetrate into the very abyſs of nature.

7. Since

7. Since however, this divine emanation and influx upon the inferior beings of the mundane ſyſtem, is communicated by means of ſidereal irradiations, much of the theoſophic philoſophy conſiſts in being acquainted with the *true ſcience of aſtronomy*; with the harmony and connection between the ſtars, human bodies, animals, earth, minerals and plants.

8. Since the ſame (plaſtic) ſpirit is concealed in all theſe, and the marks impreſſed on their external appearance are analogous thereto, the *ſignatures of things* are of no ſmall moment in diſcovering their internal nature and properties, and are therefore to be ſtudied by the theoſopher; who muſt apply fire as the key to unlock the receſſes of nature, and thus by the aſſiſtance of chemiſtry lay open the internal conſtitution of minerals, ſtones and metals.

9. By means of this admirable branch of wiſdom an adept is able to tranſmute metals and perfect them to the utmoſt, and to preſerve and continue life itſelf to an endleſs immortality.

10. Hence then it appears that man conſiſts of three diſtinct parts, a ſpark or particle of the divine eſſence; an aſtral ſpirit; and a corporeal ſubſtance; that as long as he continues in bondage to the body, he participates of the condition of brutes; by the aſtral ſpirit he is thence recalled to humanity; and by the ſpark of the divine light which he poſſeſſes, he is taught to aſcend up to God the fountain of light. The ſoul thus gets quit of that leaven of ſin which lies concealed in the body, and which defiles the aſtral ſpirit, and ſeeks the pure centre of exiſtence and the ultimate term of felicity.

11. By the influence and extenſion of the divine ſciences and the communication of wiſdom from on high, this ſupreme felicity may commence even in this life; to which the doctrines of the theoſophiſts point the way.

Such are the principal tenets common to the theoſophers of whatever claſs: their reſpective peculiar reveries, would lead me much too far, were I to attempt the enumeration;

tion ; but however ſtrange and fanciful their *opinions* may be, theſe are not ſo ſingular as the language and manner in which they are delivered. Of theſe opinions indeed ſome are not very diſſimilar to ſuch as had been advanced aforetime among the Gnoſtics, Platonics, and Chriſtian Cabaliſts ; although, excepting ſuch information as converſation might ſupply, there is no room to ſuſpect that Paracelſus and Behmen drew from thoſe ſources, whatever Fludd might do ; and even of him, it cannot be proved that he borrowed from any preceding writer.

Upon the whole of this enumeration then, it appears that the defenders of phyſiognomy, the profeſſed teachers of the ſcience, have been either teachers and defenders of alchemy, magic, aſtrology, or theoſophy, or all of them ; and of courſe that it was utterly impoſſible that theſe doctrines ſhould be rejected without ſome contamination on the character of the companion ſcience of phyſiognomy.* A circumſtance which to have omitted would have rendered, the ſlighteſt ſketch of the literary hiſtory of phyſiognomy groſsly deficient.

* It happens rather unfortunately for the ſcience in queſtion that even in this day her principal votary (Lavater) ſhould be generally conſidered as a ſtrenuous ſupporter of a ſect of myſtics. Vid, Mirabeau's Secret Hiſt. of the court of Berlin.

DESCRIPTION

D. Folonet Armiger del.t

Phenomenon seen by Lt. Haygarth 13. Feb. 1780

Wilson Aquat.t

DESCRIPTION *of a* GLORY; *by* JOHN HAYGARTH, M. B. F. R. S. *Lond.* F. R. S. *and* R. M. S. *Edinb. and Fellow of the American Academy of Arts and Sciences. Communicated by Dr. Percival.*

READ MARCH 13, 1789.

ON the thirteenth of February 1780, as I was returning to Chester, and ascending, at Rhealt, the mountain, which forms the eastern boundary of the Vale of Clwyd, I observed a rare and curious phænomenon. My ingenious friend Mr. Falconer, has given, from my description, an exact representation of it, in a drawing which accompanies this paper. (See plate IV.)

In the road above me, I was struck with the peculiar appearance of a very white shining cloud, that lay remarkably close to the ground. The sun was nearly setting, but shone extremely bright. I walked up to the cloud, and my shadow was projected into it; when, a very unexpected, and beautiful scene was presented to my view. The head of my shadow (see plate IV.) was surrounded, at some distance, by a circle of various colours, whose centre appeared to be near the situation of the eye, and whose circumference

cumference extended to the ſhoulders. The circle was complete, except what the ſhadow of my body intercepted. It exhibited the moſt vivid colours, red being outermoſt: as far as can be recollected, all the colours appeared in the ſame order and proportion that the rain-bow preſents to our view. It reſembled, very exactly, what in pictures is termed a *glory*, around the head of our Saviour, and of ſaints: not indeed that luminous radiance, which is painted cloſe to the head, but an arch of concentric colours, which is placed ſeparate and diſtinct from it. As I walked forward, this *glory* approached or retired, juſt as the inequality of the ground ſhortened or lengthened my ſhadow. The cloud being ſometimes in a ſmall valley below me, ſometimes on the ſame level, or on higher ground, the variation of the ſhadow, and *glory* became extremely ſtriking and ſingular.

To add to the beauty of the ſcene, there appeared, at a conſiderable diſtance, to the right and left, the arches of a white ſhining bow. Theſe arches were in the form of, and broader than a rain-bow: but were not completely joined into a ſemicircle above, on account of the ſhallowneſs of the cloud. When my chaiſe came up, I could obſerve no peculiar appearance round the ſhadows of the poſtillion, horſes, or chaiſe. But the poſtillion was alarmed, to an uncommon degree, by this very ſingular appari-

tion:

tion: which indeed, might excite terror, or delight, in the beholder, according to the diſpoſition of mind with which it was viewed.

Several appearances have been deſcribed by philoſophers, in ſome reſpects reſembling what I ſaw, but not exactly the ſame. The arch in ſize, ſituation and colour was moſt exactly the *glory* repreſented in ſome pictures, and is manifeſtly the archetype whence it has been copied by a painter. Indeed ſuch a phænomenon is well adapted to excite religious awe and reverence.

When I returned into the chaiſe, a bright radiance appeared cloſe to its ſhadow, but no ſeparate coloured circle was formed.

In order to inveſtigate the cauſe of theſe curious appearances, on optical principles, it may be uſeful to note ſome peculiar circumſtances. The cloud was ſpecifically heavier than the air of that region where it was placed: for, it deſcended, with conſiderable velocity, down the ſide of the mountain. It was very cloſe and ſhallow, being, in part, compreſſed by its own weight, the air at that altitude being too rare to ſuſpend it.

I have ſeen, at other times, but not frequently, clouds of the ſame appearance. On the 28th of November 1780, I ſaw ſome clouds which exactly reſembled thoſe in which the *glory* was obſerved, but had not leiſure to approach them.

Theſe were remarkably cloſe, compact, and ſhallow on the mountain; but, in the adjoining valley (of Mold) they were thin, rare, and deep. In the valley, the aſmoſphere and the clouds ſeemed to be of the ſame ſpecific gravity. The cloud on the mountain had a ſhining brightneſs, where the ſun ſhone upon it, but was extremely black where ſhaded by other clouds.

In ſome caſes, the cloud, in which a ſimilar appearance has been obſerved, was thought to be compoſed of frozen particles. It probably was ſo in the preſent inſtance. For, ſome hours later, the ſame evening, being on horſe-back, and paſſing through a like cloud, icicles had formed on my hair, which by the motion of riding, produced a ſound, like the ringing of diſtant bells.

No coloured arch, like a rain-bow, I believe, has ever appeared in a hail or ſnow ſhower: the frozen drops are probably too opake, too diſtant, and too large to exhibit ſuch colours. But the proximity and the minuteneſs of the frozen particles, in the cloud above deſcribed, might probably allow the rays of light to be reflected, and refracted in a coloured circle. Experiments on thin frozen ſurfaces in a priſmatic form, or on ſmall frozen particles of water, might ſucceſsfully illuſtrate this curious ſubject. Glaſs incruſted with ice may afford ſome obſervations. And the ſun ſhining on a ſurface of ſnow, covered

covered with a hoar-frost, exhibits, as I have lately remarked, beautiful brilliant points of various colours, as, red, green, blue, &c. reflected and refracted at different angles; which, by attentive observation, might perhaps explain the cause both of the *glory*, and of the bright arches above described.

EXPLANATION *of the* PLATE.

CC. The white cloud.
AA. The shining arches.
SS. The shadow.
GG. The glory.

EXPERIMENTS *on the* FUSION *of* PLATINA; *by Mr.* THOMAS WILLIS, *Chemist, at the Hermitage, London. Communicated by Mr.* THOMAS HENRY, F.R.S. *&c.*

READ AUGUST 13, 1789.

TO MR. THOMAS HENRY.

LONDON, JULY 18, 1789.

SIR,

I HEREWITH inclose you a few experiments on platina, and beg the favour of you to lay them before your truly commendable society. I should have been happy could I have succeeded in rendering this extraordinary metal malleable,

as it would have been of the greateſt conſequence in conſtructing optical inſtruments, on account of its not being affected by the air. I do not deſpair of ſucceeding, as my intention is to purſue this object ſtill further, and I ſhall with pleaſure communicate my future proceſſes to the public through your moſt excellent inſtitution.

I am, SIR,

Your moſt obedient, &c.

THOMAS WILLIS.

I OFFER the following experiments to the public with a view to promote further reſearches into the properties of this extraordinary metal, and in hopes that by rendering the method of fuſion better known, I may induce others to purſue the object ſo far, as to be the means of diſcovering methods of making it malleable. It was the appearance of ſucceſs in Mr. Nowell's two firſt experiments that engaged me to try the following proceſſes, and I hope they are deſcribed ſo plainly, that any gentleman may readily and eaſily perform the ſame, who has been accuſtomed to the common operation of fuſions.

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I am almoſt a ſtranger to what has *really* been done on the continent, having heard ſo many contradictory accounts; and I have not availed myſelf of any thing that has hitherto been performed. The experiments were conducted, exactly, as they are deſcribed, and ſeveral gentlemen of veracity and experience in chemiſtry were generally preſent. The great price platina bears in London has prevented me from making many more operations, but it is hoped theſe will be received with candour.

Experiments *on the* Fusion *of* Platina.

EXPERIMENT I.

Mr. Nowell having mixed one ounce of platina with a flux of nitre, ſand and borax, after three hours expoſure to a conſiderable degree of fire in a wind furnace, ſigns of fuſion were perceived in the maſs in general, and ſeveral globules, larger than I had ever ſeen before, appeared in different parts of the vitreous flux; of theſe, the largeſt were nearer the middle and top of the maſs, and there was much leſs appearance of fuſion at bottom.

EXPERIMENT II.

On ſeeing the above product, it occurred to me, that if a bed of charcoal powder was put into the crucible to the heighth of one fourth part, and the charge of platina, &c. put on it, it

would be expoſed to a greater heat. I therefore deſired Mr. Nowell to mix one ounce of platina with half an ounce of nitre, and half an ounce of glaſs of phoſphorus, to put the mixture on a bed of charcoal in the crucible, and to keep it three hours in the fire, which he did, and produced one maſs completely fuſed, that weighed about one drachm, beſides ſeveral ſmaller maſſes.

EXPERIMENT III.

As I had made ſeveral unſucceſsful attempts to melt platina by itſelf, I was reſolved to try if it could be done by mixing one ounce of borax without any charcoal at bottom; but after three hours I found only a coheſion, not a perfect fuſion: there were only ſmall globules near the upper ſurface of the maſs.

EXPERIMENT IV.

I bruiſed the cohering maſs of the laſt experiment, and mixed one drachm of alkali of tartar, two dramchs of borax powder, and one drachm of charcoal powder with it, put it on a bed of charcoal powder, and continued it three hours in the fire, and thus produced a perfect fuſion of the whole platina; half a drachm only of the original ounce being wanting. The ſpecific gravity of this was taken and proved to be 15.353. It was ſent to different poliſhers and lapidaries, but was ſo hard, that it ſpoiled their tools:

tools: it is not highly poliſhed, and is much paler than ſteel, but not ſo white as ſilver.

EXPERIMENT V.

I mixed one ounce of platina in grains with one drachm of alkali of tartar, two drachms of borax powder, and one drachm of charcoal powder, and put the mixture on a bed of charcoal duſt in the crucible; and as I had obſerved ſomething of an incipient fuſion when the crucible had been in the fire rather more than half an hour, I expoſed it one hour and a half, and obtained a perfect fuſion. The fuſed maſs was in two parts. The deficiency of weight of platina thus fuſed was half a drachm. I did not preſerve the whole of the charcoal, but obtained from what was ſaved near twenty grains of unfuſed platina, which I ſuppoſed were diſperſed too far from the power of the fire to be melted. The ſpecific gravity of this parcel of fuſed platina was 16.8.

EXPERIMENT VI.

I wrapped up one ounce of platina in a piece of white paper to prevent any diſperſion of its particles, and placed it on a bed of charcoal, covering alſo the paper with charcoal powder, and in two hours obtained a perfect fuſion, with the loſs of only a few grains of the metal. The ſpecific gravity of this melted platina was 15.704. The difference of ſpecific gravity

between the platina in this and the former experiment, might probably ariſe from cavities in the latter, as I have ſince frequently found ſeveral cavities in parcels I have melted. The maſs in experiment fourth was not broken.

The ſurfaces of thoſe fuſions made with fluxes are brighter than thoſe melted *per ſe*, and for obvious reaſons, viz. becauſe the metal in the latter caſe has a more uneven preſſure on its ſurface.

EXPERIMENT VII.

Two ounces of platina were melted according to the laſt proceſs in two hours, with very little loſs of weight. Dr. Pearſon was preſent at this operation, and indeed in moſt of theſe experiments ſome perſon was preſent with me.

Dr. Pearſon obſerves, "I ſaw Mr. Willis fuſe "two ounces of platina, which he ſaid he pro- "cured from Mr. Woulfe, who had purified it "by boiling it in the marine acid. The mode "of fuſion was by placing the platina, wrapped "in paper, in the middle of a crucible, of about "three inches wide, on a bed of charcoal powder. "The charcoal was ground in a coffee-mill, "the heat was as intenſe as could be given in "his furnace.

"I put," ſays Dr. Pearſon, "five hundred "grains of platina, which had not been purified, "into the middle of finely powdered and ſifted "charcoal, in a crucible of about four inches "wide,

" wide, therefore at leaſt one inch wider than in " Mr. Willis's experiment, and gave it as great " a heat as I could well produce for near " two hours in my melting furnace : at the end " of which time I found the platina only agglu- " tinated. The fire in this experiment appeared " to have been according to Mr. Wedgwood's " clay-pieces in ſeveral parts of the crucible from " 165° to 175° of his pyrometer. The ſpecific " gravity, taken by Mr. Moore in the preſence " of Mr. Willis, Mr. Henry, junior, and myſelf, " was 15.42."

EXPERIMENT VIII.

Mr. Henry, junior, a young chemiſt of great promiſe, brought to me a piece of the coaleſced maſs, mentioned above in Dr. Pearſon's remarks, and I melted it *per ſe* upon a bed of charcoal in two hours, in a degree of heat of 140 to 150 of Mr. Wedgwood's pyrometer, but in a ſmaller crucible than the doctor uſed. Dr. Pearſon took this fuſed piece and expoſed it to the heat of a forge upon a thick plate of hammered iron, and in a white heat it became evidently in a beginning ſtate of fuſion, in which ſtate upon the hot anvil it was flattened by the hammer, but cracked like caſt iron.

The doctor ſent the other moiety of the five hundred grains that were agglutinated, mentioned under experiment ſeventh, and deſired me to try

to

to fuſe it in the ſame ſized crucible he had uſed, but the operation failed. It was tried a ſecond time, on account of the laſt operation being ſhortened a quarter of an hour, but with no better ſucceſs. On the third trial it was put in a ſmaller crucible, and ſtill the operation failed. There was a ſtrong agglutination, but not a perfect fuſion. The conjecture of the cauſe of this failure will be mentioned hereafter.

Mr. Henry, junior, was preſent at all the operations mentioned under experiment eighth, and Wedgwood's pyrometer pieces were put into each crucible to aſcertain the degrees of heat.

In this and all the experiments before-mentioned the fire was not remarkably ſtrong, but in feeding it with cauk, care was taken that it never burnt ſo low as to fall much below the upper part of the inverted crucible, and no fuel was added, which had not been previouſly heated on the iron plate which covered the furnace.

The pyrometer piece indicated 160° in the laſt operation that miſcarried, and in the other two the fire was at leaſt 140° to 150°.

EXPERIMENT IX.

One ounce of platina was placed on a bed of pulveriſed Welch coal, in the ſame manner as in the former experiments with charcoal, and an uniform fuſion was in one hour and a half effected. It muſt be obſerved, that in all theſe operations the

the time of the continuance of the crucible in the fire was computed from the time it began to be red-hot until the laſt charge of cauk.

By ſeveral experiments made ſince the above, I have found that platina is capable of beginning to melt ſo as to form a ſmooth ſurface in 136° and to be in perfect fuſion at 150°.

I tried the malleability of the maſs fuſed in experiment fifth, and with a moderate blow with the hammer very little impreſſion was made, but with a few heavier ſtrokes, it broke into two pieces. The grain was cloſe and reſembled that of fractured ſteel, but ſomewhat duller. I treated in the ſame manner the maſs melted *per ſe* in experiment ſixth, and with the ſame effect, and the grain was perfectly ſimilar. On filing this latter piece, it was found very hard, and exhibited a ſplendour nearly as bright as ſilver.

EXPERIMENT X.

Mr. Nowell, who was preſent at many of the operations, deſired me to try whether platina would not melt on a bed of powdered clay or bone aſhes. I filled a crucible about one fourth part with calcined bone aſhes in powder, and put one ounce of platina wrapped up in paper on it, and expoſed it for two hours to the greateſt heat I could produce; but the platina was not melted, only a coheſion had taken place. Part of the bone aſhes near the platina at the top, was

was converted into a white enamel, but in the lower part of the crucible, the bone aſhes were only a ſpongy maſs.

EXPERIMENT XI.

I diſſolved half an ounce of platina in twenty-four ounces of aqua regia and obtained a ſolution by digeſtion in heat. A precipitate was made by a ſaturated ſolution of ſal ammoniac, which precipitate, when dried, weighed half an ounce. This was put on a bed of charcoal in a crucible, and in half an hour's time, it was cracked, and all the precipitate was loſt in the fire.

EXPERIMENT XII.

One ounce of platina was *bruiſed*, and diſſolved more readily than in the former experiment in twenty-eight ounces of aqua regia. This ſolution was precipitated with a ſolution of ſal ammoniac, and after drying the precipitate I took one fourth part of it and added half a pint of water, and ſtirred them well with a ſtick, and then ſaturated it with dry volatile alkali. The liquor was filtrated from it, and the powder, being dried, was put on a bed of charcoal powder, and expoſed for two hours to the fire as in the former experiments. I obtained only thirty-one grains of fuſed platina: fifteen of which were in five larger globules, the remainder in very ſmall ones.

EXPERI-

EXPERIMENT XIII.

The other three parts of the precipitate prepared in the laſt experiment, were treated in the ſame manner with dry volatile alkali, and I endeavoured to melt it upon a bed of charcoal, but could only obtain ſmall globules after the application of an intenſe heat for two hours. Theſe globules were powdered and mixed with one drachm of borax, one drachm of alkali of tartar, and one drachm of charcoal: a very ſmall quantity of charcoal powder was at the bottom of the crucible, and in two hours I obtained a complete fuſion. There was one large button, which weighed one hundred and ſixty grains, and ſeveral ſmall globules, ſome of which were ſo intermixed with the vitreous flux that they could not be weighed. The ſpecific gravity of this was 23.4, it was very cloſe grained and had no cavity, but was not malleable.

EXPERIMENT XIV.

As I had melted the platina in the laſt experiment with a flux and only a *little charcoal* at the bottom of the crucible, I tried to melt it without any flux, but with only a ſmall quantity of charcoal. The platina was wrapped in paper and *juſt covered with charcoal*, and (as in all the former experiments) an inverted crucible ſerved inſtead of a cover. In two hours time I obtained a complete

a complete fuſion. I repeated this experiment two or three times, and always fuſed the platina, ſo that I think it extremely probable, that in the three operations I made to fuſe Dr. Pearſon's platina and failed, there was too much charcoal added at the bottom of the crucible.

I have alſo obſerved in one of my experiments for fuſing platina by itſelf, that it continued in a fluid ſtate for more than five minutes after the crucible was taken from the fire, for on breaking the crucible, it was perfectly fluid and ran like melted lead on the floor of the laboratory.

I tried to melt another parcel of platina in grains ſent to me by Dr. Pearſon, but the crucible falling from the ſtand after it had been in the fire half an hour, there was only an adheſion. This adheſive maſs was bruiſed and treated as in the laſt experiment, and it melted in two hours. Its ſpecific gravity was 14.65, but there were ſeveral cavities found in it when broken, and it was the whiteſt of any of my ſpecimens.

EXPERIMENT XV.

As all the experiments made by me were done in one furnace, and the degrees of fire employed very little above 160° of Wedgwood's pyrometer, I tried to melt ſome platina *per ſe* in another furnace, which produced a conſiderably greater degree of heat. In my firſt experiment

ment in one hour and a half the crucible was melted flat, and the platina loſt in the clinkers and aſhes, which were thrown away.

I made another experiment, and though I did not keep the fire ſo ſtrong, yet the upper crucible was partly melted, and by its preſſure cracked the bottom one, and the contents were again diſcharged among the aſhes and clinkers: theſe next day were carefully examined, and where any ſmall globules of platina could be traced among the clinkers, thoſe were ſaved as well as the aſhes, and were very eaſily melted into a flag. A button of platina was found at the bottom of the crucible, which weighed near three parts of the whole weight that was put in, but it was of a dull colour.—Finding that inverted crucibles, in an intenſe fire, were improper, I have ever ſince uſed flat covers to them.

EXPERIMENT XVI.

Hearing, very lately, that in France platina had been melted eaſily with glaſs of phoſphorus firſt, and afterwards by itſelf, and that it was rendered malleable by this proceſs, I put half an ounce of glaſs of phoſphorus in powder, to one ounce of platina, and after two hours expoſure to a ſtrong heat there was only a ſtrong adheſion, not a complete fuſion. The maſs was bruiſed and put into a crucible with very little charcoal at bottom, and in two hours there

there was a perfect fuſion. It was not malleable, and when broken, was coarſe grained and had no apparent cavity. The ſpecific gravity was only 12.3.

EXPERIMENT XVII.

One ounce of platina was mixed with only two drachms of glaſs phoſphorus, but after two hours of very ſtrong heat, there was only an agglutination. The maſs was afterwards bruiſed and put into a crucible, with a little charcoal at bottom, and a complete fuſion was effected in two hours. This was not more malleable than the laſt, and on breaking it, it was finer grained than that in the laſt experiment, but the ſpecific gravity was only 13.89; although there were no cavities diſcovered.

There were five different ſorts of platina in grains uſed in theſe experiments, one of Mr. Nowell's, two ſorts of Dr. Pearſon's, and two of my own.

EXPERIMENT XVIII.

As the platina uſed after the fourteenth experiment was different from that of my own uſed before, and the fifteenth not being ſucceſsful, I repeated the latter with the ſame platina as uſed in thoſe experiments, and in two hours fuſed it. It had a ſmooth ſurface, and when broken had no cavities; the ſpecific gravity

gravity was 16.13. This was melted in the furnace which drew the ſtrongeſt, as were all the experiments from the fourteenth. The fuel was placed only a little above the cover of the crucible, and a vacancy between the draught-hole being left, the fire was prevented from being too intenſe.

PROPOSITIONS *reſpecting the* FOUNDATION *of* CIVIL GOVERNMENT; *by* THOMAS COOPER, *Eſq.*

READ* MARCH 7, 1787.

I HAVE often thought that the natural rights of mankind and the equitable principles of civil government, might be ſtated ſomewhat more briefly than I have any where ſeen them. With this view I have drawn up the following paper, containing the ſubſtance of many important diſcuſſions concerning the great outlines of civil liberty. It is of great conſequence in my opinion, that a ſubject in which every member of ſociety is ſo immediately intereſted, ſhould be treated if poſſible ſo plainly as to be generally underſtood, and ſo briefly as to be

* The Paper on Phyſiognomy, by Thomas Cooper, Eſq. already inſerted (page 408), was read at the Society, October 15, 1783.

eaſily remembered. I cannot ſay, however, that I have accompliſhed my own ideas in theſe reſpects; but where I have failed, I hope ſome other will ſucceed. At any rate, different modes of ſtating the ſame points cannot but have their uſe, eſpecially on a ſubject ſo important, and of ſuch direct and extenſive application.

Prop. I. The right of exerciſing political power is either derived entirely from the conſent of the people over whom it is exerciſed, or it is not. If not, from whence is it derived?

Ten anſwers may in effect be given to this queſtion: of which the moſt part have already been propoſed and defended reſpectively by writers expreſsly on the ſubject.

1. *It has been ſaid to be of divine appointment—derived from God.*

But which particular government is of divine appointment?* What particular form of government did he appoint? To what man, or ſet of men, did he concede this political authority? What were the terms of the grant? Was it to him or them only to whom it was originally granted, or to their poſterity alſo? Over how many men, or how many nations was this domi-

* I have ſometimes ſtated the medium of proof directly, and ſometimes in the form of a queſtion, as it occurred. The latter mode is often ſhorter and more familiar.

nion

nion to be exercised? What evidence have we of the existence of the grant at all? Do any of the present rulers throughout the universe derive their right from this source, mediately or immediately? May it not be said of every usurper, as well as of the most legitimate monarch, "the powers that be are ordained of God?" All these questions may be put, and ought to be resolved before this answer can be admitted, but I have not hitherto met with a solution of any of them. And it is to be observed, that no claim of this kind can be admitted which is not clear, precise, and incontrovertible. Nor does the burden of proof lie upon the people. If a fellow-creature informs me, that I and my posterity are bound to obey his commands, it is not for me to prove that I am not so bound, but for him to prove that I am.

2. *From patriarchal authority and successive delegation from the patriarchs.*

This is the exploded hypothesis of Sir R. Filmer; but granting, for a moment, what can never be established, the right of the patriarchs to govern during the period of their existence, who can prove a right in them to transmit their power to others who come not under the same venerable description, or the uninterrupted descent, or succession, of those who would now arrogate the transmission?

3. *From parental authority: the head of a family who firſt ſettled in any country having the right of governing his deſcendants.*

This is ſomewhat ſimilar to the preceding ſource of political dominion: at any rate, however, it can only extend over the progeny of the *living* parent; a delegation to the eldeſt brother for inſtance, or to any other perſon, not being of this deſcription. But granting for a moment this right of delegation in the head of a family, to how many ſucceſſive generations does it extend? Or how can it apply to the preſent circumſtances of political affairs in any nation whatever? Moreover, as the chief if not the only good reaſons that can be aſſigned for ſubmiſſion in ſuch a caſe to parental authority, is, the greater experience of age, and the greater incitement from parental affection to act with a ſole view to the good of the family, this authority muſt ceaſe with the life of the parent, becauſe the reaſons themſelves for the ſubmiſſion will then ceaſe: for without the gift of ſupernatural foreſight no man can tell what new caſes will ariſe in the ſucceeding generation, or what kind of a governor his immediate ſucceſſor will prove: and every generation weakens almoſt to annihilation the mere tie of parental affection. But farther, on what ground can a parent, even during life, claim the abſolute direction of conduct

duct over a ſon of forty years of age for inſtance? Suppoſe the ſon ſhould think the parent wrong and himſelf right, ought he to act according to the dictates of his own conſcience, or according to the commands of a father poſſibly of leſs underſtanding, and of decayed faculties? In fact it is now univerſally agreed that there are caſes and times when parental authority ceaſes to become abſolute, and changes into advice.

4. *The acquieſcence of a parent under any exiſting government binds the family.*

(a) This does not relate to the *origin and foundation* of civil government, for there could be no ſuch acquieſcence before the government in queſtion exiſted. *(b)* The parent cannot bind the ſon to perpetual ſubmiſſion even to parental authority, and much leſs to the authority of others. *(c)* If this ſource of authority were well founded, then would the acquieſcence of a parent under tyranny and deſpotiſm, bind the ſon to obey likewiſe. *(d)* It is always allowed that no parent can deprive his ſon of his *perſonal* rights; he may limit what belongs to himſelf, the property he means to tranſmit, as he pleaſes; but he has no right to what belongs to the ſon. *(e)* This ſource would preclude all additions to, or diminutions of, the governing power, in any way whatever after the death of the father; for to ſuch, the parental acquieſcence could not

apply, and the then government would no longer be binding. *(f)* All the objections to the laſt anſwer (the third) apply in ſubſtance to this. *(g)* This anſwer, like the reſt, is a *gratis dictum*; an unproved aſſertion.

5. *The perſonal acquieſcence of the governed, under the government exiſting.*

If ſuch an acquieſcence be the reſult of force, and inability to reſiſt, it amounts to nothing, and is no real acquieſcence. If it be voluntary, it amounts to an implied aſſent, and then the perſons governed are ſo governed with their own conſent. As applied to the *origin* of government, this ſource of authority thus expreſſed cannot be admitted; for none then exiſted.

6. *It may be ſaid that men are* BORN *ſubjects of ſome particular ſtate, and that in conſequence of this, they owe perpetual allegiance to the government thereof.*

This has been, and ſtill is ſaid, but it has never been proved. *(h)* It applies not to the *origin* of government, and before the particular ſtate in queſtion was conſtituted: and it may here be obſerved once for all, that as none of the nations upon earth has exiſted as a political community from all eternity, every ſuch political community muſt have had an origin, or beginning of ſome kind; and if the political dominion

dominion was improperly obtained by the governors originally, the forcible continuance of it by their ſucceſſors, cannot make *their* authority equitable. Long continuance cannot alter the nature of iniquity and convert it into juſtice. *(c)* This ſource of dominion would ſanctify the groſſeſt tyranny and deſpotiſm. *(d)* It may well be denied that there is any thing in the mere circumſtance of being born in this or that part of the globe, that can equitably ſubject any one to the perpetual government of any other of his fellow-creatures: and if it be placed upon the circumſtance of the parents being ſubjects, the preceding objections to *parental acquieſcence*, apply. *(e)* This anſwer converts human beings into a ſpecies of property. *(f)* It is contrary to the maxim, that allegiance and protection are reciprocal, for a man may renounce protection. *(g)* It makes the people born for the government, inſtead of the government being created for the people.

7. *Is it not derived from preſcription, from long continuance?*

No: for it could not have been of long continuance when it was firſt exerciſed; and if it could, preſcription gives no right but in the poſitive inſtitutes of municipal law; even there, *ſeries annorum non conſecrat errorem.*

8. *Does not actual power, the poſſeſſion of force give right?*

No: for if ſo, then is any man juſtified in deſpoiling another, provided the firſt be the ſtronger. Moreover if might give right, then ought every parent of ſixty or ſeventy to be in abſolute ſubjection to his more powerful ſon of thirty.

9. *From conqueſt.*

With reſpect to the original derivation of civil authority this claim is nugatory: conqueſt muſt neceſſarily have been poſterior to communities, or conqueſt itſelf could not have been.

Conqueſt, however, is in all caſes purſued either *(a)* for the mere purpoſes of ambition and increaſe of territory: or *(b)* in purſuit of a war in ſome other way unjuſtly commenced on the part of the conquerors: or *(c)* to compel reſtitution for a national injury committed: or *(d)* to prevent any farther attempt of the ſame kind where there is good ground to ſuſpect ſuch an intention.

In the caſes *(a)* and *(b)* conqueſt can never ſupport the claim in queſtion; for an act of injuſtice can never be the foundation of an equitable right.

In the caſe *(c)* if the vanquiſhed nation make reſtitution, no farther claim lies againſt them, and it ſeldom if ever happens that reſtitution cannot

cannot be made. If not, then it may be granted that the conquering nation may dispose of, or detain such part of the territorial possessions of the vanquished as are sufficient to satisfy the damage sustained. But when *personal* resistance has ceased, no claim can exist against the *persons* of the vanquished, and *à fortiori* none against their children and descendants. This case, therefore, furnishes no ground for the right to political authority and permanent dominion. With respect to the territory detained, the original inhabitants who choose to remain, or others who accept or purchase portions thereof, do so upon certain terms; so that the power over them must be derived from compact, *i. e.* their own consent. These observations will apply also to the case *(d)*.

10. *But do not superior abilities, or superior attainments confer the right of ruling?*

No: for *(a)* there is just the same reason for a person's interference in my private business, because he pretends to know more of it than I do, as there is for his interference in my public business on the same pretence. *(b)* Moreover, has the community or the individual the right of deciding who possesses such? Surely not the latter, or the claims would be infinite; and if the former, then for whatever reason the authority is conferred, it is derived from the consent of the community.

community. *(c)* Public tranſactions do not require more than ordinary talents. A man of common underſtanding with the requiſite application to the neceſſary ſtudies, is as equal to the public as to the private departments of life. *(d)* This ſcheme would introduce all the evils of competition. *(e)* Connections and riches would perpetually interfere, ſo as to render the choice impracticable on the ſole ground of ability. *(f)* In a large community it would be impoſſible to determine who had the beſt title on this ſcore.

Beſide theſe I think no other ſources of political authority can be pointed out; and as none of theſe appear to furniſh ſufficient ground for the claim, but are all ſubject to inſuperable objections, I conclude, that *the right of exerciſing political power, whether about to commence or actually exiſting, is derived ſolely from the people.* Of courſe, wherever ſuch power is exerciſed, unleſs by virtue of a compact expreſs, or upon ſufficient ground implied, ſuch exertion is TYRANNY.

II. But the people (*i. e.* a multitude of individuals) can have no right to exerciſe power, authority, or dominion over a fellow-creature, in their collective capacity, except in thoſe caſes where they had ſuch a right in their capacity of individuals. The *people* is a term, expreſſing an aggregate of individuals; and the rights of the people (previous to compact) are no other than the aggregate of the rights belonging in common

to

to the individuals who compoſe the people. If any other rights be aſcribed to *the people*, whence are they derived? Excepting therefore ſuch caſes as theſe, viz. the right of parental dominion until manhood; the right of bodily coercion to prevent an injury being offered; the right of repelling an injury attempted; and the right of compelling reſtitution for an injury committed, it will follow from this and the firſt propoſition, that no power, authority, or dominion can juſtly be exerciſed over any individual which has not been precedently derived from his own conſent. Caſes of infancy, idiocy, lunacy, coverture, and others ſimilar, are evidently included in the preceding exception: ſuch perſons alſo being either naturally or by compact, *ſui incompotes*, incapable of ſelf-direction. With reſpect however to unmarried women at years of diſcretion, the common practice of nations appears to be inequitable, and perhaps indeed to the married.

III. The authority of the governors, is derived from the conſent of the governed. But no man can reaſonably be preſumed, voluntarily to have delegated to another any dominion over himſelf, but for his own good; and in expectation of ſomething in return at leaſt equivalent to the conceſſion. Nor can any man be ſuppoſed to prefer the ſtate of civil ſociety, but with a proſpect of living more happily upon the whole by becoming a member of ſuch a ſtate, than otherwiſe.

wiſe. Hence, the happineſs of the community (*i. e.* of the individuals who compoſe it) is the great end and object of civil ſociety; and the regulations adopted, are or ought to be, no other than the means to that end.

IV. Farther, as no man can reaſonably be preſumed to have made a voluntary ſurrender of any right previouſly enjoyed, or to have ſubmitted voluntarily to any ſubjection, but in expectation that in the ſum of happineſs upon the whole he would be no loſer by ſo doing; it follows, that no right can be preſumed to be given up, or any dominion delegated, but what is abſolutely neceſſary to attain the great object of civil ſociety, viz. his own happineſs in common with that of the other individuals who have done the ſame: otherwiſe we muſt ſuppoſe a voluntary conceſſion of rights for the benefit of others, and a voluntary ſubjection to the will of others without an expected equivalent in return: which, except in the caſes of family connections, or obligations conferred, or peculiar friendſhip, is abſurd.

V. Alſo, wherever it can be made highly probable that from the nature of civil ſociety, it cannot afford an equivalent for any particular right ſuppoſed to be ſurrendered, we may fairly conclude that ſuch right never was or could have been ſurrendered. Thus the right of a man to the excluſive ſociety of his wife, the

right

right of a parent to educate his children in his own way, the right of following the dictates of conscience in matters of religion, the right of resisting a sudden attempt to deprive one of life, &c. are such as have no equivalent to my knowledge in any thing that society can bestow. It cannot therefore in equity be presumed that these rights are renounced on becoming a member of political society, nor can society be presumed to require the renunciation of that, which it cannot purchase by an equivalent.

VI. By Prop. III. *& seq.* wherever the power or dominion delegated is inconsistent with the object of civil society, for which alone it was delegated, the persons delegating must have a right of recalling or annulling partially or totally, as circumstances may require, that power which no longer answers the ends of its creation. *Cessante ratione cessat et ipsa lex.* Hence also, the propriety of frequent revisions of political constitutions. For experience alone can determine the kind and degree of power which is absolutely necessary and no more, to effect the purposes of civil society. With respect to which indeed our knowledge hitherto seems in its infancy.

VII. In case of any dispute respecting authority claimed, the burden of proof lies rigorously upon the claimants. For it is strictly incumbent on every man before he acts, to be certain that he is not about to do an act of injustice,

more

more eſpecially if the ſlighteſt intimation be given that this may be the conſequence. Nor is it at all incumbent on thoſe who are the objects of exerted authority to prove that no ſuch authority equitably exiſts; for it is indiſputable that no man is bound to prove a negative. Experience moreover ſhews the liability to abuſe of entruſted authority, and the conſequent propriety of inſiſting on this condition.

VIII. For the ſame reaſon, wherever the renunciation of a right on the part of the governed, is claimed by the governors as neceſſary to the ends of ſociety, it is incumbent on the latter (more eſpecially if required) to point out clearly the neceſſity alledged. Exerted authority, where the propriety demanded is not ſhewn, is the ſame as if it were improperly (*i. e.* tyrannically) exerted. *De non apparentibus et non exiſtentibus eadem eſt ratio.*

IX. Nor can the renunciation of any right be demanded of one individual which may not be equally required of every other individual of the community, otherwiſe ſociety will be benefitted at the expence of an act of injuſtice; for it ought to be preſumed that every member of a community enters into it upon equal terms with the reſt, there being no reaſon in the nature of the thing, why ſome ſhould be ſuppoſed to join voluntarily in a ſociety under peculiar diſadvantages,

diſadvantages, or to conſent that excluſive privileges ſhould belong to others.

X. Hence if from peculiar circumſtances the good of the community require that ſome part of its members ſhould give up certain of their rights, or be in any way reſtrained in the enjoyment of them, this can only be inſiſted on in the way of purchaſe; and a full equivalent is due to thoſe who thus contribute to the good of the community out of the common proportion of the reſt of its members. Of courſe, where ſociety has no equivalent to beſtow in return for the renunciation or reſtriction of any right on the part of ſuch of its members from whom it is expected, this renunciation or reſtriction cannot be compelled without an act of injuſtice.

XI. Neither is it to be preſumed that on entering into ſociety we have ſurrendered the right of doing that, which, independent of ſociety and antecedent thereto, it was our *duty* to perform. A debt from *A* to *B* can never be cancelled by any agreement between *A* and *C* wherein *B* is no way concerned. It is a duty (for inſtance) incumbent upon every man, whether he be or be not a member of ſociety to worſhip God in that way which his judgment points out as the moſt proper; nor can any compact expreſs or implied between him, and others of his fellow-creatures juſtify any breach whatever of his duty to his Creator.

XII. Moreover

XII. Moreover as the intent or end of ſociety is the promotion of the happineſs of the individuals who compoſe it, and as the benefits of ſociety can extend to or be enjoyed during a *part* of our exiſtence only—we may infer generally, that the means of promoting our happineſs in ſociety (*i. e.* the regulations we ſubmit to therein) ought to coincide with the means we are to uſe for promoting our happineſs upon the *whole* of our exiſtence, and when political ſociety with reſpect to us, ſhall be no more. Otherwiſe ſociety, inſtead of adding to our happineſs upon the whole, would decreaſe it, and the ſole object of its inſtitution would be defeated.

XIII. It is to be obſerved, however, that we are not permitted *to do evil that good may come*; for any enormity might be juſtified upon ſuch a pretence. So that, if any perſon under an idea that he is performing a duty of ſuperior obligation to thoſe of ſociety, does an injury to the perſon or the property of his neighbour, it will be perfectly conſiſtent with the ends of ſociety that ſuch perſon be puniſhed; not indeed under the notion of preventing his obedience to the dictates of his conſcience, but upon the general ground of preventing and repreſſing injurious conduct. For without this the ends of ſociety could never be accompliſhed, nor could ſociety itſelf exiſt; while the puniſhment of the perſon injuring, on the other pretence, viz. be-

cauſe

cauſe we think his conſcience is miſinformed would be a groſs act of injuſtice; and equally applicable againſt ourſelves as againſt him. Moreover, the right of repelling an injury, would have belonged to the perſon injured on whatever pretence it were offered, had ſociety never exiſted. This reaſoning is agreeable to the common axioms of, *ſic utere tuo ut alieno non ledas.* And, rights inconſiſtent with, or deſtructive of each other, cannot exiſt.

The ſix laſt propoſitions, are applicable to the ſubject of *religious liberty.*

XIV. Society is intended to promote the happineſs of the individuals who compoſe it. Hence the intereſt (*i. e.* the happineſs) of the majority, is to be preferred to that of the minority. Otherwiſe ſociety would produce a decreaſe, and not an addition to the ſum of temporal happineſs. It is poſſible indeed, that promoting the intereſt of the minor part, might in ſome particular caſe produce a degree of happineſs equal to ten, while promoting the intereſt of the major-part, in that particular caſe might produce a degree of happineſs equal only to nine. In ſuch a caſe the degree ten ought perhaps to be preferred. But as we are not in poſſeſſion of a ſufficient number of data, in the preſent ſtate of human affairs, to aſcertain ſuch a point as this, it cannot practically be noticed. So that the general rule in this propoſition holds true.

XV. Hence, excepting thoſe rights which it would be inconſiſtent with the ends of ſociety to renounce, or that are unneceſſary to the ends of ſociety, or connected with duties of prior or ſuperior obligation to thoſe of ſociety—the intereſt of any one or any number of individuals conſtituting the minority only, muſt be preſumed to be conceded where it interferes with the intereſt of the majority.

XVI. Hence alſo, for every practical purpoſe the majority is ſynonimous with the ſociety.

XVII. The ſame reaſons will hold with reſpect to all thoſe caſes where the opinions of the individuals who compoſe the ſociety, are requiſite concerning any propoſed means of compaſſing the ends of ſociety. For if the opinions of the few were in all caſes to be deemed of equal weight with the opinions of the many, the object of ſociety would be perpetually fruſtrated, nor could ſociety itſelf long exiſt.

XVIII. Moreover, in all caſes where the ſentiments of the majority cannot be aſcertained *numeratim* or individually, it muſt of neceſſity be preſumed that an *active* majority is a true majority: for where every one may be active who chuſes, the preſumption is equal on both ſides of the queſtion concerning thoſe who are apparently neuter. Hence, whenever an opportunity is given to all, publicly to ſignify their ſentiments on any general queſtions, the majority of thoſe

thoſe who thus actually ſignify their ſentiments, ought to be accounted the majority of the whole.

XIX. But as it is impoſſible even for the majority of a ſociety, to act individually without ſuch confuſion as would defeat the end of the aſſembly, unleſs in very ſmall communities, a few muſt of neceſſity be deputed to act for the many.

The propoſitions reſpecting majorities, will of courſe hold true concerning theſe (comparative) few.

XX. The few, thus deputed to act for the many, of courſe alſo, receive all their authority from their conſtituents, for there is no other ſource, conſiſtent with the maxim already exhibited.

XXI. As this authority is conceded for ſome end or purpoſe, it muſt of courſe be limited in extent and duration by the end or purpoſe for which it was created: hence the perſons deputing, muſt have a right remaining of extending or limiting, continuing or annulling the delegated authority, as the circumſtances for which it was granted may from time to time require. Alſo, as the happineſs of the community and not merely of the repreſentatives or perſons deputed, conſtitute the object of ſociety, the majority of the community, *i. e.* of the perſons deputing, muſt have the right of judging of theſe circumſtances.

XXII. If therefore the perſons deputed extend their authority in continuance or degree, either

beyond what the circumſtances require for which it was delegated; or beyond or without or againſt the inclinations of the majority of the perſons deputing them, the rights of the latter are infringed and they are injured.

XXIII. But every man who does an injury to another, of whatever kind or to whatever extent, is accountable to the perſon injured, who may demand redreſs. Hence whenever the perſons deputed exerciſe their authority inconſiſtently with the ends for which it was committed to them, they are accountable to the people who committed it. But as the people who committed it retain the right of judging whether it be properly exerted or not, the perſons to whom it is committed are accountable to the people univerſally. That is, the governors of whatever deſcription in every ſociety upon earth are accountable to the governed.

XXIV. By Prop. I. and II. no perſon can juſtly exerciſe any power or dominion over another, but what is precedently derived from that other: nor indeed can any other definition in ſubſtance be given of ſlavery than, "that ſtate "or condition in which a man is governed with-"out* his conſent." Sometimes indeed the caſes may be ſo few and the degree ſo ſlight, that it paſſes unnoticed. But that the eſſence of

* Not, "againſt," for this may conſiſt with freedom.

ſlavery

ſlavery is ſuch as above deſcribed, will be evident to any one who will be at the pains of thinking on the ſubject. Hence if any member of a ſociety is deprived of the means of aſſenting or diſſenting, either by himſelf or his repreſentative, to the regulations of that ſociety to which he is at the ſame time obnoxious in quality of being a member thereof; or if through any circumſtances which do not affect the individuals of the community in common as well as himſelf, or to which he hath not had an opportunity of previouſly aſſenting, his aſſent or diſſent is rendered ineffectual, ſuch perſon is clearly under a dominion and rule which is not ultimately derived from himſelf: his ſtate with reſpect to thoſe regulations and the executive officers of them, is a ſtate of ſlavery, and the enforcement of thoſe regulations with reſpect to him is tyranny. Nor is the nature of the thing changed becauſe others are ſufferers as well as himſelf, or becauſe the tyranny is only exerted to a certain degree.

XXV. The caſe of a ſtranger, not permanently reſident, is hardly an exception to the preceding propoſition, for by the terms, ſuch an one is not a member of the ſociety in queſtion, but of ſome other. And, in fact, his voluntary reſidence in or paſſage through the territory of any ſociety but his own, amounts to an aſſent for the time to the regulations of that ſociety which he thus voluntarily enters.

XXVI. It is a queſtion, however, much more difficult to determine, whether the right of ſuffrage, ſhould be in any degree regulated by the poſſeſſion of *property*, or be conſidered as a right ſimply attached to the *perſon*. For my own part, after much conſideration, I incline to think that a line of excluſion *may* be drawn, and that no injuſtice is done by debarring thoſe from voting in the choice of national repreſentatives, who on account of their poverty, are exempted from the payment of all taxes. For, firſt, no perſon can demand to interfere in framing laws, who contributes nothing to the expence of enacting or enforcing them. Secondly, Nor can any one demand this, who poſſeſſes no oſtenſible pledge that he will ſubmit to the execution of them. Thirdly, By far the greateſt part of laws relate to objects in which ſuch a perſon has no intereſt. For inſtance, it is abſurd to give a right of legiſlating concerning the property of others, to thoſe who have none of their own; and who riſk nothing on the event of their own regulations. Fourthly, A certain quantity of territory is eſſentially neceſſary to the exiſtence of a political community; and it is optional to the poſſeſſors thereof, to admit or reject as members of the community upon their own terms, thoſe who have no proprietary or uſufructuary right to any part of ſuch territory; provided alſo it be left optional to the latter, to accept or reject a

membership

membership on the terms proposed. Fifthly, As so large a portion of the laws of every community consist of regulations concerning property, the right of suffrage ought to be considered as connected with both the objects of law, viz. persons and property. Even if two separate legislatures were provided, one for a *civil*, and the other for a *criminal code*, yet would the preceding objections hold with respect to the latter. Sixthly, The exclusion on the ground above-mentioned, would extend to so small a portion of the society, that where the representation is adequate there would be little chance but the regulations adopted would accord with the inclinations of a majority of the *whole* community.

To the preceding reasons may be added, the difficulty of ascertaining who had or had not voted before for any particular district, if mere personality gave this right—the probable suspicion of want of knowledge and independance in this class of people—the consideration that those who enjoyed the right in question, would be equally interested with the persons excluded, as to those laws in which alone the latter could claim an interest—the stimulus to exertion, which the exclusion itself would furnish—and the superior facility with which the suffrages of a community could be collected, if confined to

houſeholders paying (as the term is in England) ſcot and lot.

Notwithſtanding however I incline upon the whole to the propriety of ſuch an excluſion as here propoſed, I ſtill think the ſubject requires more diſcuſſion than has yet been given it; and that to make the excluſion itſelf equitable, no puniſhment ought to be enjoined involving the claſs excluded, which every other individual would not be equally ſubject to, for the ſame crime: and alſo that no regulations ought to be made reſpecting the individuals of the claſs thus excluded, and thoſe of any other, which in their operation would not be equally beneficial to both; and laſtly, that free egreſs out of the community ſhould be allowed to all thoſe who are diſinclined to ſtay in it; in which caſe perhaps an implied conſent may fairly be preſumed on the part of thoſe who voluntarily remain.

XXVII. This laſt condition is indeed contrary to a maxim (I believe) univerſal among municipal lawyers, viz. that "the natural born "ſubject of a ſtate is under an obligation to "perpetual allegiance"—a maxim (already noticed in Prop. I. and) beyond all doubt abſurd and tyrannical—abſurd in as much as all civil ſociety is founded on compact, and no compact can be valid unleſs between parties able and willing to contract; but the mere fortuitous circumſtance of being born here or there in this ſtate

ſtate or that, is not under the controul of the native at the time, nor is ability or willingneſs then predicable concerning him; nor can any right be ſhewn in a parent to make an indefeaſible contract on the part of his child, to be performed when the latter is no longer under the controul of the former: tyrannical this maxim is, becauſe whatever may be the government, however deſpotic in principles or practice, it arrogates perpetual indefeaſible dominion, underived from the conſent, expreſs or implied, of the perſon governed. This particular queſtion however I ſhall treat expreſsly much more at large, at ſome future opportunity.

XXVIII. The preceding propoſitions have been deduced abſtractedly from the conſideration of any particular ſociety, and appear to hold univerſally true concerning ſociety itſelf; and therefore where a civil ſociety is already formed, theſe propoſitions ought to be conſidered as the terms and foundations of the implied compact among the members; the oppoſite propoſitions being inequitable. Hence whether a man is about to enter for the firſt time as a member of any political community; or whether (fortuitouſly with reſpect to himſelf) he finds himſelf already a member of ſuch a community, his rights are ſtill the ſame, and all dominion over him muſt ultimately be derived from his own conſent expreſsly given or equitably implied.

XXIX. Where-

XXIX. Wherever therefore any political government is not conſtituted and exerciſed in conformity to this grand maxim, "that all power is derived from the people," and the evident conſequences deducible from that maxim—the governed are injured; and deprived of rights, which may be proved to belong to them. So that the people in every nation upon earth, may juſtly demand that the government under which they live, be altered in conformity to that maxim, wherever it is not ſo already.

XXX. But it is univerſally allowed, that wherever a right exiſts, there exiſts alſo concomitantly, a right to the means of obtaining it; elſe the right itſelf is nugatory. So that if any right belonging to the people, ſhould be forcibly infringed, or withholden from them by the governors of any community, after repeated applications for redreſs in a peaceable way, the former have a right forcibly to obtain it.

XXXI. Alſo from Prop. VI. and XXI. it may be deduced univerſally that whenever any alteration in the form of government, or change in the officers of government appears eligible to the majority of the people, they have a right to inſiſt on ſuch alteration or change, whether the officers before appointed were temporary or hereditary. For, whether the office itſelf, or the officers, anſwer the purpoſe of their appointment, muſt be decided either by the governors

governors or the governed. This right of determination ought not to belong to the former, becauſe they not only may, but generally have an intereſt oppoſite to the welfare of the whole community—the honours, the power and the emoluments annexed to offices of government, being univerſally deſirable, the poſſeſſors will be perpetually induced to ſupport their own continuance in the enjoyment of them, whether neceſſary or otherwiſe to the ends of ſociety. The people however *can* have no intereſt but that of the community at large (*i. e.* of themſelves) and of courſe can have no other object in determining, but the object itſelf for which ſociety was formed.

The will of the people therefore (*i. e.* of the majority) aſcertained as correctly as the nature of the caſe will admit is of itſelf a ſufficient reaſon for any change whatever, in the conſtitution of a kingdom or the officers of government.

XXXII. As the people have this right, they have alſo a right to the means of enabling them to exerciſe it: otherwiſe (as I have obſerved before) the right itſelf is nugatory; a mere name. Hence if after every peaceable method of obtaining any political change, has been repeatedly uſed in vain on the part of the people, the latter will be juſtified in riſing to *compel* an obedience to their commands.

XXXIII. But

XXXIII. But as it cannot be ſuppoſed that the majority of the people will riſe at one and the ſame inſtant of time, there muſt be ſome riſe before others. So that if the common and peaceable methods to obtain a compliance with the requiſitions of the people, have been unſucceſsfully repeated, any number of men however ſmall are juſtified in making a beginning, where a beginning muſt neceſſarily be made: nor can any general reaſonings, nor do any hiſtorical facts warrant the opinion that ſuch changes or alterations will ever be attempted on light ground: that burden muſt be heavy indeed which a whole people unite to ſhake off.

XXXIV. But as every member of ſociety ought to aim at the welfare of the community, and of courſe ſhould endeavour to produce the greateſt balance of good upon the whole; in caſe any alteration although deſirable to the majority of the nation, if attempted by force, is likely to produce a conſiderable degree of reſiſtance from the officers in power, the good to be obtained by the alteration ought to be compared with the evils likely to enſue from the enforcement of it; and if the latter, *obviouſly* preponderate, no man can be juſtified in attempting ſuch alteration by force at *that opportunity*.

In all caſes however, it is to be conſidered in the compariſon, that the evils, will moſt probably afflict the preſent generation only: the good, will moſt

moſt probably endure to poſterity for an indefinite length of time. Thus England enjoys the benefit of the exertions of the people under the tyrants John, Charles, and James even at this day: the evils of thoſe exertions were confined to a generation or two.

Such are the *principal* deductions, from that grand maxim, the very corner ſtone of legitimate government, that *all power is derived from the people*. Deductions, which the rulers of the earth have ſeldom inclined to admit, as they tend to the abolition of uſurped authority. But thoſe only will inveigh againſt promulgating the civil rights of mankind, who either mean to infringe thoſe rights, or have ſome intereſt or other in defending thoſe who do. Sedition againſt the officers of government, is a fruitful ſource of criminal juriſdiction; while ſedition againſt the majeſty of the people, is a crime unknown to the penal code, and univerſally practiſed with impunity and in caſes out of number arrogated as a right, by the ſervants of the people in every nation upon earth.

The ſtructure of political oppreſſion however, begins now to totter: its day is far ſpent: the extenſion of knowledge has undermined its foundations, and I hope the day is not far diſtant when in Europe at leaſt, one ſtone of the fabric will not be left upon another.

OBSERVATIONS *on the* ART *of* PAINTING; *among the* ANCIENTS; *by* THOMAS COOPER, *Esq.*

READ DECEMBER 21, 1785.

PART I.

MR. KERSHAW, in his ingenious paper on the comparative Merit of the Ancients and Moderns with respect to the imitative Arts, is of opinion that the ancients were inferior to the moderns in point of colouring, because the former *having only four colours*, black, white, red, and yellow, could not possibly from these produce the variety of tints necessary even to a moderate colourist.

This opinion of the paucity of colours in use among the ancient painters, though a common one, and countenanced by authors of repute on the subject of painting,* is certainly erroneous

* Thus De Piles says, Pliny writes that "the masters "of the art of painting in his time made use of but four "capital colours, out of which they produced all others." Art of Painting. Life of Protogenes. In fact Pliny says no such thing, but directly the contrary, as will be seen hereafter.

"Another

erroneous when adopted without reſtriction; I ſhall therefore take the liberty of offering to the ſociety ſome obſervations on this ſubject, as well as on the general ſtate of painting among the ancients.

The greateſt part of this eſſay would be totally needleſs and many a quotation ſaved, could the remains of ancient paintings which Italy poſſeſſes, be tranſported hither for our ocular inſpection: but as that cannot be the caſe, we muſt be content to rely upon the teſtimony of others, under circumſtances where we cannot decide upon our own, and much of the following eſſay muſt therefore unavoidably conſiſt of quotations from ancient authors.* The elegant ſelection

" Another circumſtance that tends to prejudice me in " favour of their colouring, is, that ſome of their (*i. e.* the " ancients) principal painters uſed but four colours only. " I am convinced the fewer the colours, the cleaner will " be the effect of thoſe colours, and that four is ſufficient " to make every combination required." Sir Joſhua Reynolds. Notes to Maſon's Freſnoy, p. 94.

* Some few of the following quotations I have taken at ſecond hand; and in this caſe I have quoted conjointly the modern author to whom I am indebted. I have been the leſs ſparing in quotations and references, becauſe had my time permitted me to fulfil my intentions I meant this eſſay to conſiſt chiefly of what has never yet been *attempted* in any moderate compaſs, or in any tolerable degree *executed*, viz. a common place of paſſages relating to the various departments of ancient painting. The dull maſs of

ſelection however from the antique paintings diſcovered at Herculaneum, contained in the "Voyage Pittureſque de Sicile," many of which Mr. L. Philips has accurately copied for the inſpection of the ſociety, will contribute in ſome meaſure to ſupply the want of the valuable originals, and elucidate the topics of this paper, excepting in the circumſtance of colouring.

I propoſe in the following pages to conſider *briefly*, 1. Whether the ancients had at any time more than *four colours*, and at what period more were in uſe.

2. Whether they were deficient in DESIGN, EXPRESSION, COLOURING, COMPOSITION, (including *harmony* of *colouring*, *chiaro-ſcuro*, and *grouping*) INVENTION, COUTUME, or PERSPECTIVE.*

of literary lumber which Junius has heaped together in his prolix folio, contains many appoſite quotations, but *rari nantes in gurgite vaſto*. The papers in the Memoirs of the Academy of Inſcriptions are far ſuperior; combining (in general) learning with taſte; but they are in a voluminous and ſcarce work; too long; imperfect; and too partial to the ancients. Such other diſſertations of merit as I have met with comparing ancient and modern painting (thoſe of Dolce, Du Bos, Webb, &c.) are too curſory and incomplete to anſwer the purpoſe of a ſummary of knowledge on this ſubject.

* The three firſt, may be applied to paintings containing only a ſingle figure: the three laſt to performances more complicated.

3. What

3. What we know of them as PORTRAIT, LANDSCAPE, COMIC and SATIRICAL painters.

4. What were the various modes of painting among the ancients with reſpect to the MECHANICAL parts of the art. And

5. What miſcellaneous obſervations appear worth noting.

I apprehend, the notion that the ancients in general had no more than *four colours* in uſe, for painting, was deduced from a haſty peruſal or miſapprehenſion of the paſſages quoted in the notes from Ariſtotle,* Cicero,† Pliny,‡

* περι κοσμε, cap. 5. Ζωγραφια λευκων τε και μελαινων, &c. Pictura ex diſcordibus pigmentorum coloribus, atris, albis, luteis, et puniceis, confuſione modicâ temperatis, imagines iis quos imitatur ſimiles facit.

† Similis in pictura ratio eſt, in quâ Zeuxim, et Polygnotum, et Timantem, et eorum qui non ſunt uſi plus quatuor coloribus, formas et lineamenta laudamus: at in Ætione, Nicomacho, Protogene, et Apelle, jam perfecta ſunt omnia. In Brut. num. 70.

‡ Quatuor coloribus ſolis immortalia illa opera fecêre; ex albis Melino, ex ſilaceis Attico, ex rubris Sinopide Ponticâ, ex nigris Atramento, Apelles, Echion, Melanthius, Nicomachus, clariſſimi pictores, cum Tabulæ eorum ſingulæ, oppidorum venirent opibus. Hiſt. Nat. lib. XXXV. 32. So alſo XXXV. 36. ſpeaking of the paintings of Apelles, he ſays, Legentes meminerint omnia ea quatuor coloribus facta. Theſe paſſages are contradictory to the implication reſpecting Apelles in the preceding quotation from Cicero.

Philoſtratus,* and Quintilian.† But it will be evident from an attentive conſideration of the paſſages themſelves, and ſtill more from the authorities I am about to adduce, that this opinion is true only with reſpect to the ancients κατ' ἐξοχην, to thoſe who were ſtiled ancients in the days of Cicero and Pliny, and not with reſpect to perſons ſo called in the writings or converſation of the moderns, by whom Cicero and Pliny themſelves are properly ranked among the *ancients*.

It is ſomewhat ſingular alſo, that almoſt all theſe paſſages, either upon the face of them as quoted, or with the addition of the ſucceeding ſentences, in the original, manifeſtly prove that the ancient painters, cotemporary with theſe authors, had a variety of colours in uſe. Thus in the paſſage from Cicero: "In their paintings, ſays he, "who uſed no more than four colours, "ſuch as Zeuxis, Polygnotus, and Timantes, we "admire the outline and the features; but in "Ætion, Protogenes, Nicomachus and Apelles, "all is perfect," evidently including colouring,

* την δε Ζωγραφιαν αυτην, &c. Picturam enim non eam ſolùm videris putare quæ coloribus abſolvitur. Nempe unus etiam color veteribus illis pictoribus ſatis erat. Incrementa verò capiens ars quatuor adhiberit; inde plures etiam; at et linearum picturam, et quod coloribus deſtituitur, quod ex umbra et luce compoſitum eſt, picturam fas eſt apellare. Philoſt. Vit. Apoll. Tyan. lib. II. cap. 22. Paintings in one colour only, were called Monochromata.

† Clari pictores fuiſſe dicuntur Polygnotus atque Aglaophon, quorum ſimplex color ſui ſtudioſos adhuc habet. The *ſimplex color* here, I think, does not mean merely Monochromata. Lib. XII. cap. 10.

and

and implying that the latter ſet, uſed more than four colours.

The words immediately ſubſequent to the firſt of the paſſages quoted from Pliny are theſe; *Nunc et purpuris in parietes migrantibus, et India conferente fluminum ſuorum limum et draconum et elephantorum ſaniem, nulla nobilis pictura eſt. Omnia ergò meliora tunc fuêre cum minor copia.*

So alſo Philoſtratus: "The ancients were "ſatisfied with one colour; but the increaſing "progreſs of the art, afterward, employed four; "and from thence even more than that num-"ber."

Pliny in another place* mentions that Cratevus, Dionyſius and Metrodorus, Greek phyſicians, publiſhed paintings of plants and herbs, and wrote under them their properties: and elſewhere† he notices paintings of ſeveral kinds of birds. Neither of theſe could well be managed with white, black, red, and yellow only.‡

Philoſtratus‖ has a treatiſe among his works, containing a deſcription of ſeveral paintings which he ſaw in a collection at Naples. In the picture, among theſe, entitled *Ariadne*, Bacchus, he ſays, is clothed in purple, and his head is adorned with roſes. In the *Amphion*, Mercury preſents a cloak of the colours of the rainbow. In the *Paſiphaæ*, her whole dreſs is ſaid to ſhine

* Not to mention the grapes painted by Zeuxis: puerum uvas petentem. Plin. XXXV. 36.

† XXXV. 37. ‡ X. 5. ‖ Icon.

with celeſtial ſplendour far excelling the colours of the rainbow. In the *Tyrrheni* the ſea monſter, raiſed by Bacchus, was of a ſea-green colour. And in the *Hunters*, a moſt exquiſite purple is mentioned as the colour of one of their cloaks.

"How much more ſplendid, ſays Cicero,* "in brilliance and variety of colours, are the "paintings of modern days, than thoſe of the "ancients! but however attractive at firſt view, "they are not ſo permanently pleaſing."

But not to multiply quotations from ancient authors concerning paintings that no longer remain, it will be ſufficient to refer to the paſſages noticed below,† from modern deſcriptions of diſcovered antiques, which fully confirm the ſame point.

Indeed, no *certain* concluſion can be drawn that the more early among the great painters of the ancients, ſuch as Apollodorus, Zeuxis, Timantes, &c. had no more colours to uſe than the

* Quanto colorum pulchritudine et varietate floridiora ſunt in picturis novis pleraque quam in veteribus! quæ tamen etiamſi primo aſpectu nos ceperunt, diutiùs non delectant. De Orat. 3.

† Among the *Alcuni Oſſervazioni* at the end of the firſt and ſecond volumes of the Antiquities of Herculaneum, publiſhed by order of the king of Naples, mention is made of painted peacocks and doves among the other reliques.

Montfaucon (Suppl. à l'Antiq. p. 161.) deſcribes a beautiful painted ceiling in freſque, from which it appears not

the four already mentioned, merely becauſe they did actually uſe no more. On the contrary, it may be conjectured with ſome degree of probability, from the anecdotes related by Apelles, from the general commendations given to the more early painters for their chaſteneſs in deſign, and from the complaints Pliny* makes of the gaudy taſte of the Roman painters, that the Greeks in general were *deſignedly*† chaſte in their colouring,

not only that the ancients were in poſſeſſion of an azure or deep blue, but that they had the art of laying it on in freſque, ſo as to continue in great brilliancy *(en grande vivacitè)* for many centuries, provided the walls were not liable to be affected by damps. In p. 177, of the ſame volume, he deſcribes the habit of a painted gladiator, where a great deal of blue appears to have been uſed. In particular the concave part of the buckler *eſt d'un bleue foncè.*

In the collection of prints from the paintings in the ſepulchre of the Naſonii in the Flaminian way, publiſhed by Bellorius (Græv. tom. XII.) there are many blues and violets mentioned.

Turnbull has coloured ſome of the prints which he publiſhed from antique paintings, after the originals, and blues are to be ſeen there. See alſo Winkleman, Hiſt. de l'art chez les Anciens, vol. II. p. 93.

* XXXV. 32.

† "The paintings of the ancients," ſays Dionyſius Halicarnaſſeus, "were ſimple and unvaried in their co-"louring, but correct in their drawing, and diſtinguiſhed "by their elegance. Thoſe which ſucceeded, leſs correct "in their drawing, were more finiſhed, more varied in

colouring, and not ſo merely from neceſſity, at leaſt about the time of Zeuxis and Apelles: for the former could not have painted grapes ſo naturally as he is ſaid to have done* with the four colours only ſo often mentioned. Neither would it have been the practice of Apelles to have varniſhed his freſh paintings with brown varniſh,† if he had not poſſeſſed a true taſte in this part of painting, and purpoſely avoided the meretricious glare with which the Roman artiſts were afterwards captivated. Nor is it at all ſtrange, that a judicious eye ſhould reject, as much as poſſible, ſuch cold unmellow tints as blues and greens. Theſe obſervations are alſo confirmed by the rebuke given by Apelles‡ to one of his ſcholars, who having painted a Helen very gaudily, "young man," ſays Apelles, "not being able to make her beautiful, you have made her rich."

I think it highly probable therefore, that among the ſuperior painters in the more early ſtages of the art, no more than four colours were employed, at leaſt in portraits, and till the time

"their lights and ſhades, truſting their effect to the "multitude of their colours." In Iſæo, p. 167, edit. Oxon. Webb on Painting and Poetry, p. 83.

* Plin. Hiſt. Nat. XXXV. 36. Senec. controv. lib. X. contr. 5.

† Plin. Hiſt. Nat. XXXV. 36.

‡ Clem. Alexand. Pædag. Lib. II. cap. 12. Plin. XXXV. 3.

of

of Alexander the Great, partly perhaps from design and a preference given to a warm tone, and partly becauſe the other colours were not eaſy to be procured in a proper ſtate of perfection* till a later period of the art. From that æra a multiplicity of colours were gradually diſcovered and introduced, until the ſtock was augmented to the degree noticed by Pliny in his enumeration of the pigments employed in his time.†

That the ancients paid a particular attention to DESIGN would be evident from the manner in which they ſpeak of this department of the graphic art, even though the moderns were not in poſſeſſion of ſuch remaining proofs of their excellence herein (though by artiſts of an inferior claſs) as to place this point beyond the reach of doubt.

From the account given by Pliny of the origin and progreſs of painting‡ (an account *à priori* extremely probable) it appears that the firſt

* It appears from a paſſage of Pliny, before quoted, that purple and blue were not diſcovered till late in the æra of painting. *Nunc et purpuris in parietes migrantibus et India conferente fluminum ſuorum limum (i. e.* blue), &c.

† Lib. XXXV. 12, *et ſeq.* Pliny XXXV. 40, ſays of Pamphilus the painter, *Amavit in Juventâ Glyceram municipem ſuam, inventricem coronarum, curandoque imitatione ejus ad numeroſiſſimam* florum *varietatem perduxit artem illam.*

‡ XXXV. Paſſ.

efforts of painters were beſtowed on the outline of the objects imitated. That this is the moſt important part of the art is evident, becauſe this alone will produce a reſemblance, and without this no reſemblance can be procured by any other means. Indeed, the attempt to colour without a previous deſign would of itſelf form an outline. The ſtory related concerning the viſit of Apelles to Protogenes* ſhews that even when the art had made a conſiderable progreſs, or rather had approached towards its acme among the ancients, the teſt of ſkill was in deſigning; nor do I recollect any performance of modern ages, that proves ſo exquiſite a freedom of pencil.

Indeed, when it is conſidered that with reſpect to freedom and correctneſs of outline, painting and ſculpture are very nearly connected, that Phidias and Apelles were nearly cotemporaries, that many of the ancient painters ſuch as Zeuxis Protogenes, Apelles, &c. were accuſtomed to modelling for the purpoſe of ſculpture or of caſting,† that the extreme elegance of deſign in the ancient ſtatues is ſo notorious as to be the acknowledged model even for modern artiſts, and that theſe ornaments of ſculpture were well

* Pliny, XXXV. 36.

† Phidias alſo was ſomewhat of a painter, Plin. XXXV. 34. and XXXVI. 4.

known

known and univerſally admired among the ancients, we ſhall have little heſitation in admitting their equality with the moderns ſo far as *deſign* is concerned. But ſhould any doubt remain on this point, the drawings from the antiquities of Herculaneum already mentioned, will be ſtriking proofs, that truth, elegance and ſpirit, in a degree rarely to be met with among the moderns, were habitual even to the common run of artiſts in the declining age of ancient painting.*

The ancients excelled, moreover, not merely in the common and obvious parts of *deſign*, but they appear to have had no inconſiderable degree of ſkill in the art of *foreſhortening*. The performance of Pauſias is a proof of this. *Fecit autem grandes tabulas ſicut ſpectatum in Pompeii Porticibus Boum immolationem. Eam enim picturam primus invenit quam poſtea imitati ſunt multi, equavit nemo. Ante omnia, cum longitudinem Bovis oſtendere vellet, adverſum eum pinxit, non tranſverſum, et abundè intelligitur amplitudo. Dein cum omnes quæ volunt eminentia videri, candicantia faciant, coloremque condant, hic totum bovem atri coloris fecit; umbræque corpus ex ipſo*

* It is alſo no ſlight proof of ſkill in deſigning, that ſo many of the ancient painters, ſuch as Pauſias, Nicias, &c. undertook *large* pictures. The moſt extraordinary performance of this kind was the portrait which Nero cauſed to be taken of himſelf upon canvaſs (Linteo) whereon he was painted one hundred and twenty Roman feet in height. Plin. XXXV. 33.

dedit;

*dedit; magnâ prorſus arte in æquo extantia oſtendens et in confracto ſolida omnia.** None but a good painter would have ventured to exhibit the animal thus facing the ſpectator, and ſtill leſs would have hazarded the dark colour of the animal and of the ground, unleſs he had been ſomewhat acquainted with the principles and effect of light and ſhade.†

Toward the latter period of the art, it became faſhionable to ornament the apartments of private houſes as well as the walls of temples with freſco paintings. Moſt of the ancient paintings now remaining are of this kind; and the ceilings as well as the walls were decorated with paintings. In this purpoſe, it is well known, that conſiderable ſkill in the art of foreſhortening is neceſſary, and as the cuſtom was common, we may therefore very reaſonably conclude, that the ancients attained to great excellence in this, as well as in the whole of deſign.

Nor will it be difficult to ſhew that the ancient painters were not inferior to the moderns, in EXPRESSION: the department of painting which moſt directly applies to the feelings of mankind

* Plin. XXXV. 40.

† Pliny, ſpeaking of a picture of Jupiter among thoſe of Apelles, obſerves *Digiti eminere videntur et fulmen extra tabulam eſſe.* In all probability the arm here was foreſhortened.

at

at large, and which requires the leaſt portion of technical ſkill to decide upon.

Indeed, the ſtate of ſculpture alone among the ancients would almoſt furniſh a concluſive proof that the ſiſter art of painting could not be deficient in a qualification which the former ſo eminently poſſeſſed; more eſpecially, as they both attained a high degree of perfection about the ſame period, and the moſt famous artiſt in each, flouriſhed nearly at the ſame time. Among the ancient ſtatues alſo that yet remain, expreſſion is carried to a wonderful height; not merely the features of the face, but almoſt every muſcle of the body, combining to enforce the idea intended to be conveyed. This may be remarked of the Laocoon, the ſlave liſtening to the Conſpirators, the dying Gladiator, the Venus, Apollo, Hercules, Antinous, &c. wherein every portion of the performance is characteriſtic.

Mr. Webb* very properly obſerves that "the "ancients thought characters and manners ſo "eſſential to painting that they expreſsly term "picture, an art deſcriptive of the manners.† "Ariſtotle in his Poetics‡ ſays of Polygnotus "that he was a painter of the manners, and "objects to Zeuxis, his weakneſs in this part.

* On Painting and Poetry, 149.

† Ηθοποιικὸν τεχνη. Calliſth. in Deſcrip. Stat. Æſculap.

‡ Ηθογραφον.

"We

"We have in Philoſtratus* the following de-
"ſcription of a picture: 'we may inſtantly,"
ſays he, "diſtinguiſh Ulyſſes by his ſeverity and
"vigilance; Menelaus by his mildneſs; and
"Agamemnon by a kind of divine majeſty. In
"the ſon of Tydeus is expreſſed an air of
"freedom; Ajax is known by his ſullen fierceneſs,
"and Antilochus by his alertneſs.' To give to
"theſe ſuch ſentiments and actions as are con-
"ſequential from their peculiar characters is the
"ethic of painting."

Socrates in a dialogue with Parrhaſius the painter which Xenophon has related,† after diſcourſing on the power of painting to expreſs the characters and manners of mankind, adviſes him to paint thoſe rather which are expreſſive of beauty, goodneſs and lovelineſs‡ than their oppoſites: a proof that in the days of Parrhaſius this part of painting was principally regarded. This was the Parrhaſius who painted allegorically the genius (Demon) of the Athenians *varium, iracundum, injuſtum, inconſtantem.*‖ It was he alſo who painted *pueros duos in quibus ſpectatur ſecuritas et ætatis ſimplicitas*; an

* Επιδηλοσομεν Ιθακησι Θ-, &c. Philoſtr. in Antilocho.

† Memorab. III. 10.

‡ δι ων τα καλα τε κάγαθα και αγαπητα ηθη φαινεται, η δι ων τα αισχρα τε και πονηρα και μισητα.

‖ Plin. XXXV. 36.

elegant

elegant deſcription, on which ſome of Mr. Gainſborough's paintings are the beſt comment. But it was Ariſtides the Theban* who principally excelled in this ſublime part of painting: *qui primus omnium animum pinxit et ſenſus hominis expreſſit, quæ vocant græci ethe; item perturbationes. Durior paulo in coloribus. Hujus pictura eſt oppido capto ad matris, morientis è vulnere, mammam adrepens infans: intelligiturque ſentire matrem et timere ne emortuo lacte ſanguinem lambat.*† We ſhall not eaſily find a production of modern art, ſuperior to this. The ſame Ariſtides‡ painted alſo "a ſick perſon, a "performance that received boundleſs commen-"dation. And ſo much was he admired in this "department of the art, that king Attalus is ſaid "to have purchaſed one of his pictures at the "price of one hundred talents." It is evident that the value of this painting muſt have depended on exquiſite expreſſion.

* Ibid.

† This is not very diſſimilar to a beautiful thought in Dr. Langhorne's Country Juſtice.

Cold on Canadia's hills or Minden's plain,
Perhaps that mother mourn'd her ſoldier ſlain:
Bent o'er her babe her eyes diſſolved in dew—
The big drops mingling with the milk he drew
Gave the ſad preſage of his future years,
The child of miſery baptized in tears.

‡ Plin. *ubi ſup. Pinxit et ægrum ſine fine laudatum. Quâ in arte tantum valuit ut Attalus rex unam tabulam ejus centum talentis emiſſe traditur.*

Indeed,

Indeed, the praiſes of the ancient connoiſſeurs and the exertions of the greateſt among the ancient artiſts ſeem principally turned toward expreſſion. It was for this excellence, carried to a high degree, that the famous picture of the death of Iphigenia, by Timanthes,* was ſo much valued. *Ejus enim Iphigenia, oratorum laudibus celebrata, quâ ſtante ad aras peritùra, cum mæſtos pinxiſſet omnes precipùe patruum, et triſtitiæ omnem imaginem conſumpſiſſet, patris ipſius vultum velavit, quem dignè non poterat oſtendere.* Sir Joſhua Reynolds,† after Voltaire and Mr. Falconer, has thought fit to blame a contrivance which all the ancient world admired. It is a trick, ſays he, that will ſerve but once; an artifice to evade difficulties which ſhould have been overcome. I cannot help differing however from Sir Joſhua in opinion, reſpectable as his ſentiments are, for the following reaſons. 1. The idea ſeems evidently to be taken from the paſſage in the Iphigenia of Euripides, where Agamemnon is repreſented by the poet as he is by the painter. 2. It became the haughty character of the "King of Men," as Homer calls him, to veil from the ſight of the by-ſtanders, any appearance of human weakneſs, which a ſcene ſo melancholy might compel him to admit. 3. As the principal paſſion which the ſtory would allow of was grief, and

* Plin. *ub. ſup.* † Diſcourſes. Dec. 10, 1778.

as

as a variation *ad infinitum* of this appearance was impoſſible, the method adopted by Timanthes ſeems to have been the moſt natural under the circumſtances. 4. It is a known fact in human nature, the foundation of a known principle of art, that we are apt to conceive more highly of that which is concealed. 5. It left ſomething to the imagination of the ſpectator, which ſhould always be attended to, and was the common practice of Timanthes, the painter of this picture. *In omnibus ejus operibus intelligitur plus ſemper quam pingitur.* This is praiſe far beyond the general deſert of modern artiſts. 6. The action itſelf was the moſt natural under the circumſtances. Thoſe who feel the moſt in a caſe of diſtreſs will be the moſt anxious to hide their feelings. The moſt ingenious device may be called a trick, and if frequently repeated may deſerve reprehenſion.*

Another inſtance of excellence in expreſſion among the ancient paintings was the Medea of Timomachus. She was painted about to kill her infants. Auſonius ſpeaks with admiration of the mingled expreſſion of anger and maternal fondneſs in her face and manner. †

Immanem

* Raphael has adopted the idea in a picture of a dead Chriſt, wherein the characters of grief being exhauſted by the other figures, Mary Magdalen covers her face.

† Auſon. Ep. 122. Sir Joſhua Reynolds, in his Diſcourſes, 8vo. p. 157, decries the attempt of producing an expreſſion

Immanem exhauſit rerum in diverſa laborem
Fingeret affectum matris ut ambiguum.
Ira ſubeſt lachrymis, miſeratio non caret irâ;
Altereutrum videas ut ſit in altereutro.

Neither is the degree leſs, though the object be more inſignificant, alluded to in the following epigram of Martial.*

expreſſion of mixt paſſion. " A ſtatue (ſays he) in which you endeavour to unite, ſtately dignity, with youthful elegance and ſtern valour, muſt ſurely poſſeſs none of theſe to a very eminent degree." It will be allowed that an attempt at a mixt expreſſion of incompatible characters (as mildneſs and ſternneſs, Herculean ſtrength with the elegance and agility of the Farneſe Apollo) would be vain. But it is certainly true, Firſt, That certain mixt paſſions and characters exiſt in nature, and may be expreſſed by art: I think even his own inſtance to the contrary may. Secondly, The truth of a ſubject may admit, and the nature of it may demand this. Thirdly, Such expreſſions may be and often are more intereſting than expreſſions of ſingle character; nor do all caſes require the exceſs of any particular character to be expreſſed. How can there be a good painting of a Chriſt, unleſs with an expreſſion of dignity mixt with humility, or an evident abſence of pride? A difficult, but certainly a poſſible expreſſion; and far more ſublime and intereſting than any expreſſion of ſimple character that occurs to my recollection, unleſs perfect benevolence could be well painted. *Je n'admire point un homme* (ſays Paſcal, Penſees, 279.) *qui poſſede une vertue dans toute ſa perfection, s'il ne poſſede en meſme temps dans un pareil degré la vertue oppoſée: tel que l'Epaminondas qui avoit l'extreme valeur jointe a l'extreme benignité; car autrement ce n'eſt pas monter, c'eſt tomber. On ne monſtre pas ſa grandeur pour eſtre en une extremité mais bien en touchant les deux a la fois et rempliſſant tout l'entredeux.*

* Lib. III. Ep. 41.

Inſerta

Inſerta phialæ Mentoris manu ducta
Lacerta vivit et timetur argentum.

If it be farther conſidered that in the great age of painting, when Zeuxis, Apelles, Timanthes, Protogenes, Ariſtides, flouriſhed, gaudineſs of colouring was reckoned a defect, nothing remained (in paintings that contained but a few objects eſpecially) but *deſign* and *expreſſion* whereon their fame could be built: nothing elſe would be a ſufficient ground for the exclamation of Zeuxis,* that he *painted at eternity*; the language of nature, which all men in all ages could judge of, muſt have formed the principal part of works which could be admitted to put in ſuch a claim.

Notwithſtanding however theſe Græcian artiſts paid an inferior attention to the COLOURING of their pictures, proof is not wanting from their writings to evince, that this department of painting was carried among them to a conſiderable degree of excellence. That they were in poſſeſſion of a great variety of colours I have already proved, and mean more particularly to eſtabliſh† in the ſecond part of this paper,

* In æternitatem pingo.

† From an examination of the paſſages reſpecting the ancient pigments and ſubſtances ſo uſed, in Dioſcorides, Vitruvius, Pliny, Oribaſius, Iſidore, and Solinus (which though read at the Society, is too long to be conveniently

paper, which contains a minute compariſon of the ancient with the modern pigments. It is alſo

inſerted in the preſent volume) I find, that of *white* colouring ſubſtances, the ancients had white lead variouſly prepared, a white from calcined egg-ſhells, and preparations from cretaceous and argillaceous earths. The moderns, in addition, have magiſtery of biſmuth, little uſed; and *ought* to have, the calces of tin and zinc.

Of *blacks*, the ancients had preparations ſimilar to lamp, ivory, blue and Franckfort black: alſo to Indian ink, and common writing ink, and they uſed what we do not, the precipitate of the black dyers' vats. Black chalk and black lead were, as I think, unknown to them.

The ancients poſſeſſed a ſpecies of vermilion or fine cinnabar, a coarſer cinnabar, red lead, various reddles burnt and unburnt, apparently ſimilar to our red oker, Venetian red, Indian red, Spaniſh brown, burnt Terra di Sienna and ſcarlet oker: they had alſo a ſubſtance alike in colour and in name to our dragon's blood. Their minium was not red lead, but native vermilion or very fine cinnabar. Their red lead went under the names of *minium ſecundarium*, *& ceruſſa uſta*. They had not carmine or roſe pink, nor the lakes from kermes, cochineal, or brazil; although they appear to have had the cochineal inſect and the kermes berry. They were alſo accuſtomed to tinge calcareous and margaceous earths red, a practice which we do not uſe but for yellows.

The yellow pigments of the ancients were generically the ſame with our orpiments, king's yellow, Naples yellow, maſſicot and the yellow okers of various denominations, as well as the calcareous earths tinged yellow. They did not poſſeſs turbith mineral, mineral yellow, or gamboge, nor do they appear to have known of gall-ſtone as a pigment.

Of

alſo clear from the expreſs aſſertions of Cicero,* Vitruvius,† Pliny,‡ and Dionyſius Halicarnaſſeus,‖ that it became the faſhion in the latter

Of the *blue* paints, they had preparations from the lapis cyanus and lapis armenus; perhaps alſo from the lapis lazuli, which they poſſeſſed, and which I incline to think a different ſtone from the former. Indigo they had, and perhaps bice and ſmalt, for they made blue glaſs, but whether from ſome ore of cobalt or of wolfram muſt be uncertain, perhaps the former. They had not Pruſſian blue, verditer nor litmus, which we have. We do not uſe the blue precipitate of the dyers' vats, nor mountain blue, which they certainly employed.

Of *green* colours, they had verdegriſe, terra verte, and malachite or mountain green. The latter is not in uſe among us. Sap green, green verditer, and Scheele's green appear to have been unknown to them. The modern Brunſwick green is ſtill kept ſecret. Like us alſo they procured as many tints as they pleaſed from blues, and yellow vegetables.

We have no *original purple* in uſe: that from gold by means of tin, though very good when well prepared, is too dear perhaps, and unneceſſary. Their purple was a tinged earth.

Their *orange* or ſandarac (red orpiment) we alſo poſſeſs. Hence there does not appear to have been any great want of pigments, or any very material difference between the colours they uſed and ſuch as we generally employ. Perhaps the full effect of colouring may be obtained without the uſe of the exceeding brilliant pigments, depending chiefly on the proportion and oppoſition of tints.

* De Orat. 3. † Lib. VII. cap. 5. ‡ XXXV. 32.

‖ In Iſæo. p. 167, edit. Oxon. Greg. Nazienz. Carm. 10. Webb.

period of the art, particularly with the Roman artiſts, to truſt principally to their colouring. So that nothing can be more clear, than that they enjoyed the *means* of colouring well, except perhaps in the very early ſtage of painting.

It may not be amiſs, however, at this period of our inquiry, to make ſome obſervations on the teſtimonies of ancient authors reſpecting the ſubjects of this eſſay. It is certainly true, that when the works of an ancient artiſt are praiſed for any real or ſuppoſed merit, the commendations will be relative to the degree of perfection to which the art had ariſen at the time, and to the opportunities of information, the taſte and judgment of the perſon who beſtows them. Excellence will always be aſcribed to him who leaves his cotemporaries far behind, and thoſe performances will often be conſidered as ſupremely beautiful which exceed in beauty all that have gone before.

In like manner a perſon of natural ſenſibility, but who has been accuſtomed all his life to performances of an inferior ſtamp, will be in raptures at any which much exceed the beſt he has heretofore been taught to admire; and whatever opportunities of information he may have, his evidence will not be of much weight, if he do not poſſeſs a ſufficient degree of taſte and judgment to uſe them properly.

In

In aſcertaining therefore the degree of credit, due to the praiſes beſtowed on any performance in a branch of the fine arts, we muſt take into conſideration the general ſtate of the art at the time, and the competence of the perſon who beſtows the praiſe.

No ſlight degree of probability however may be attained on both theſe points, by attending to a circumſtance not generally noticed, viz. that in an advanced ſtate of the art, and when the obſerver is acquainted with his ſubject, the praiſe will ſeldom be given in looſe, general and comprehenſive expreſſions, but the terms in which it is conveyed will be chracteriſtic and determinate, and often technical; they will frequently ſhew the ſtate of the art by marking the ſubdiviſions, and the ſkill of the obſerver by judicious diſcrimination. When added to theſe, the latter can reſort for compariſon to any exiſtent ſtandard of perfection, his praiſe may fairly be adopted in its full extent, and regarded as evidence upon the point in queſtion.

Thus, if a modern were to commend the muſical performance of a great maſter in ſome general terms, ſimilar, or nearly ſo, to thoſe before made uſe of concerning a muſician of equal eminence by an ancient author, we ſhould have no doubt whatever, from known collateral circumſtances reſpecting the comparative ſtates of the ſcience, that a far higher degree of abſolute

knowledge and ſkill would be implied in the praiſe of the modern, than we could reaſonably aſcribe to the commendations of the ancient. So alſo, if any perſon in the preſent day, were to praiſe very highly the muſical ſkill of ſome performer of eminence, no great degree of credit would be given to the commendation, unleſs we knew before-hand the competence of the perſon who beſtowed the praiſe, or unleſs the mode of commendation itſelf implied a certain degree of knowledge in the man who preſumed to judge. The ſtile of commendation which Dr. Burney would adopt, would be very different from the praiſes of him whoſe knowledge was bounded by a boarding ſchool minuet, or a Scotch reel.

To apply theſe obſervations to painting: It is clear from what has been already advanced, that with reſpect to the moſt difficult, the moſt fundamental, and the higheſt in rank among the departments of the art,* the ancients were fully equal to the moderns; and their expreſſions of praiſe muſt be allowed to imply an equal degree of abſolute ſkill, with ſimilar expreſſions, if applied to the great maſters of modern art. It is alſo clear that painting was extremely cultivated among the ancients, and that their good painters were more eſteemed than artiſts of equal

* Deſign and expreſſion.

merit

merit in modern times:* that what we ſhould term gentlemen-artiſts were frequent with them:† that many treatiſes were publiſhed on the art itſelf, and the various branches of it:‡ that the expreſſions of the ancient connoiſſeurs evince much theoretical and technical knowledge of the art, and diſplay a diſtribution of its parts almoſt

* This ſeems evidently to have been the caſe with Zeuxis, Apelles, Protogenes, and ſome other of the great painters, the price of whoſe performances would now be deemed enormous; one of Apelles' paintings for inſtance brought him twenty golden talents; upwards of fifty thouſand pounds. Pliny, in his account of Protogenes, mentions that when Demetrius beſieged Rhodes, he gave orders to his troops to take care that Protogenes was not moleſted, ſaying, he made war not with the arts, but with the Rhodians.

† *Apud Romanos quoque honos maturè huic arti contigit, &c.* he proceeds to enumerate ſeveral perſons of note who had formerly been painters. See. alſo XXXV. 9. and XXXV. 36. § 9. In XXXV. 40. is an enumeration of female painters.

‡ *Hanc ei (Parrhaſio) gloriam conceſſere* Antigonus *et* Zinocrates *qui de picturis ſcripſere.* Plin. XXXV. 36. Antigonus wrote περὶ πινακων. *(De Tabulis). Diog. Laert.* in *Chryſippo*, p. 209. Nicias, the painter, appears alſo to have written on the ſubject: Nicias *ſcripſit ſe inuſſiſſe; tali enim uſus eſt verbo.* Plin. XXXV. 10. Euxenidas, Ibid. XXXV. 36. § 9. Pamphilus of Macedon *in picturâ omnibus literis eruditus præcipuè arithmeticè et geometricè ſine quibus negabat artem perfici poſſe. Docuit neminem minoris talento annuo.* The ſubſequent part of the paſſage affords ſtrong

almoſt as minute, complete and ſcientific, as the preſent ſtate of it can boaſt.*

When Plutarch, therefore, relating the diſpute of the two painters, Parrhaſius and Euphranor, tells us that Euphranor objected to his rival, that the Theſeus painted by Parrhaſius, looked as if he had been fed with roſes, while his own ſeemed fed on fleſh : † and when

proof of the high eſtimation in which the art was holden. Plin. ub. ſup. Apelles *picturæ ſolus propè quam cæteri omnes contulit*; *voluminibus etiam editis quæ doctrinam eam continent. ub. ſup.* Euphranor Iſthmius *volumina quoque compoſuit de ſymmetriâ et coloribus.* Ib. XXXV. 40. *Geminus*, the Rhodian alſo, in Cicero's time, wrote on perſpective.

* It will appear from paſſages introduced in illuſtration of the various parts of this eſſay that the ancient writers, in ſpeaking of painters, praiſe or blame them with evident judgment and diſcrimination: that they notice the ſeveral ſchools of painting: that they expreſsly mention and remark upon the ſcience of light and ſhade; correctneſs of outline; anatomical proportion; invention; expreſſion; ordonnance or compoſition; relief; coutume; perſpective; handling; tone of colouring; harmony of colouring; ſoftneſs and mellowneſs, and chalkineſs or hardneſs of colouring; that they praiſe Apelles in particular for ſobriety and chaſteneſs of colouring, and inveigh againſt the oppoſite fault; and theſe in appoſite and technical expreſſions evidently exhibiting much knowledge of the ſubject.

† Ευφρανωρ τον Θησεα τον εαυτε τω Παρρασιε παρεβαλε λεγων τον μεν εκεινε ρoδα βεβρωκεναι, τον δε εαυτε κρεα βοεια. Plut. Bellone an pace clariores fuerunt Athenienſes. Webb, 85. See alſo Plin. XXXV. 40. where the ſame anecdote is mentioned.

Pliny

Pliny* gives an account of the two warriors painted by Parrhaſius, where the perſpiration of the one and the anhelation of the other were ſo viſible and natural: when the naked hero of Apelles† is ſaid to challenge nature herſelf; and when Propertius can find no greater compliment to pay to his miſtreſs' complexion, than to compare it with the tints of that artiſt:‡ we can hardly refuſe them a competence of judgment in a point, where examples of ultimate perfection were frequently preſenting themſelves. This at leaſt muſt be allowed ſo far as the carnation tint was concerned.‖

There is alſo good reaſon to ſuppoſe, from the paſſages adduced in the beginning of this eſſay, which give an account of the painting of flowers, peacocks, &c. among the ancients,

* *Sunt et duæ picturæ ejus nobiliſſimæ, hoplittes in certamine ita decurrens ut ſudare videatur; alter arma deponens ut anhelare ſentiatur.* XXXV. 35.

† *Pinxit et heroa nudum, eâque picturâ naturam ipſam provocavit.* Ibid.

‡ *Qualis Apelleis eſt color in tabulis.*

‖ This would be true even though the ancients and the moderns had different notions of the carnation tint, owing to the difference in the ſtandard from difference of climate: which however would be very ſlight. They appear to have made accurate diſtinctions on this point: *color in nivco corpore purpureus: purpureus ore rubor, &c.*

that

that they had arrived at no ſlight degree of ſkill in the *handling* of ſubjects of this kind.

The following paſſage* from Lucian ſhews a conſiderable degree of attention paid to the colouring of fleſh, the object on which painters in general have found it moſt difficult to ſucceed.

" Lycinus: You ſhall ſee; and firſt from the " Cnidian Venus I ſhall take the head alone; " the body being naked, we have no occaſion " for the forehead, hair, and perfect ſhape of " the eye-brows exactly as Praxiteles has made " them, together with that ſwimming,† ſoftneſs " and vivacity of the eyes which he has ſo finely " repreſented. The cheeks, the look of the " full face, with the extremities of the hands, " the fine proportioned wriſt, and the delicate " fingers growing thin at the tips from Alca- " menes. Phidias and his Lemnian will ſupply

* The paſſage is in his dialogue entitled " ΕΙΚΟΝΕΣ, *Imagines*," at ſome little diſtance from the beginning: Λυ. και μεν ηδη σοι ορᾶν παρεχει γιγνομενην, &c. Turnbull has quoted it, (Ancient Paintings, Preface, p. 2.) I adopt Francklin's tranſlation; though ſomewhat too haſty and free, and not exhibiting the preciſe meaning. In the preſent caſe however it is better than Turnbull's.

† Francklin juſtly remarks " that the Greek expreſſion is inimitably elegant Οφθαλμων το υγρον αμα τω φαιδρω *Oculorum mobilem hilaremque gratiam*"—Like Horace's *vultus nimium lubricus aſpici.*

" us

" us with the general turn of the countenance and " ſize of the noſe; the mouth and neck we will " take from his Amazon. Calamides ſhall fur- " niſh us with the modeſty of his Soſandra, " the ſweet half ſmile on her countenance, and " the well folded, becoming robe. Her head " however ſhall be undreſſed; and her age about " that of Cnidian Venus of Praxiteles. What " think you, my friend, will not the picture " be charming, if well finiſhed?

" Polyſtratus: Are you ſure, my friend, you " have omitted nothing in the compoſition of " your beauty?

" Lycinus: Not that I know of, unleſs per- " haps you think it cannot be complete without " the proper colouring. There indeed we muſt " be deficient: for how ſhall we procure it? " Shall we call in all thoſe painters who are " famous for blending their colours with taſte " and judgment, Polygnotus, Euphranor, Ætion, " and Apelles? Let theſe divide the taſk. " Euphranor ſhall lend us his Juno's hair; Po- " lygnotus, the handſome eye-brow and roſy " cheeks of his Delphian Caſſandra. He too " ſhall furniſh us with a robe of the fineſt work, " moſt of it flowing in looſe folds, and ſuccinct " only where it ought to be ſo. The reſt of the " body we ſhall take from the Pacata of Apelles, " with a ſkin not too pale and fair, but ſhewing " the blood within; while Ætion ſhall give us " the lips of his Roxana."

Theſe

Theſe praiſes, however, relate chiefly to the ſtile of colouring of the ancient painters, as exerted upon ſingle figures or particular tints. It may therefore be doubted, whether the ancients were poſſeſſed of the art of diſtributing their colours through the whole of a picture ſo as to produce an harmony and general tone of colouring ſimilar to that which we admire in the Lombard and Flemiſh ſchools. I confeſs I am not perfectly decided upon this point. The preſent remains of ancient paintings do not appear to warrant any ſuch concluſion, but their authority is very ſmall when alleged *againſt* the general or particular merit of the ancient artiſts; being undoubtedly the works of inferior hands. I incline however, upon the whole, to think that the ancients did attend to this technical branch of colouring, chiefly upon the authority of the extracts I am about to adduce.

Indeed the modern technical expreſſions appear borrowed from the following paſſage of Pliny,* which I have been almoſt tempted to regard as deciſive on the ſubject. *Tandem ſeſe ars ipſa diſtinxit, et invenit* Lumen atque umbras, *differentia colorum alternâ vice ſeſe excitante. Dein adjectus eſt* ſplendor; *alius hic quam lumen; quum quia inter hoc et umbram eſſet appellaverunt* tonon. *Commiſſuras verò colorum et tranſitus,* harmogen.

* XXXV. 11.

It

It would be difficult to expreſs more accurately, in plainer language, or in fewer words, the *light and ſhade** of a picture; the general *tone* of colouring, and the *handling*, or ſkilful blending and ſoftening of colours into one another. It ſhould ſeem clear from this paſſage, that the ancients paid an attention to the colouring of a picture as a *whole*; and that they not only adjuſted the artificial ſubordination of lights and ſhades, but the management of the various colours, ſo as to produce a diſtinct *general* effect. There are, however, many other paſſages among the ancient writers, which will induce us to conclude that they were acquainted with the general theory of colouring. Lucian,† in his fine deſcription of that ſpirited painting by Zeuxis of the male and female Centaurs, after relating the treatment of the ſubject itſelf, proceeds to notice the technical execution of the picture: and he praiſes

* I ſhould have regarded the *Lumen atque umbras* of this paſſage as merely deſcriptive of the light and ſhade neceſſary to relieve ſingle figures, if it were not for the ſubſequent definition of *tone*. The *harmogen* of Pliny, I take to mean the *handling*, or the ſtile of pencilling, ſo as to leave a degree of finiſh or otherwiſe upon the picture, rather than what we now call *harmony*, or the uſe of ſuch tints in ſuch maſſes or proportions, and in ſuch parts of the picture reſpectively to each other as fall well in uniſon together, and unite to make the painting ſeem a *whole* as to the colouring of it.

† In his Zeuxis.

particularly

particularly the truth and delicacy of the *drawing*:* the perfect blending of the colours:† the ſkilful *ſhading*;‡ the ſcientific preſervation of ſize and magnitude:‖ and the equality and harmony of the proportions throughout the whole piece.§ Zeuxis having publicly exhibited this picture, and finding it was praiſed by the people for the novelty and ingenuity of the ſubject only, and that its ſkilful execution as a painting was loſt upon them, ordered his pupil to cover it up and take it home.

Painters (ſays Plutarch¶) increaſe the effect of the light and ſplendid parts of a picture by the neighbourhood of dark tints and ſhades. And

* οιον το αποδειναι ἰας γραμμας ες το ευθυτατον.

† των χρωματων ακριβην την κρασιν.

‡ σκιασαι ες δεον.

‖ τας μεγεθας τον λογον.

§ την των μετρων προς το ολον ισοτητα και αρμονιαν: this ſeems to relate to all the before-mentioned parts: if ſo, note † implies harmony of colouring, and note ‡ the *ſcience* of light and ſhade.

¶ De deſcrip. Adul. et Amici. οι ζωγραφοι, &c. Pictores lucida et ſplendida, umbroſis et tenebroſis intendunt prope conſtituentes. Again, περι ευθυμιας. δει χρωματων, &c. Oportet iis qui colores hilares et ſplendidos proponunt abſcondere triſtia et reprimere. Deleri enim omnino nequeunt nec mutari poſſunt. Junius, 170. This laſt paſſage however may be taken both ways.

Maximus

Maximus Tyrius * obſerves that bright and vivid colours are always pleaſant to the eye, but this pleaſure is always leſſened if you omit to accompany them with ſomewhat dark and gloomy. Theſe paſſages ſeem to imply a knowledge of the uſe of cold and dark tints even where a brilliancy of tone was required. The beſt among the ancient painters, however, ſeem to have preferred a chaſte and ſober ſtile of colouring to the gaudineſs and flutter of the later artiſts. And it is worth notice, that in this reſpect the progreſs of the art has been exactly ſimilar among the ancients as among the moderns. The older artiſts of both periods, and thoſe who have eſtabliſhed the higheſt reputation for excellence in the ſublimer walks of the art, ſeem in a great degree to have neglected colouring, and conſtantly beſtowed an inferior ſhare of attention upon it. The lower claſs of painters, and the later ſchools, thoſe who paint to the eye rather than to the mind, have principally excelled in that which their ſuperiors neglected. Among the ancients, Zeuxis, Apelles and the earlieſt and beſt of the artiſts appear (at leaſt frequently) to have truſted to four colours only. Apelles went ſo far as to cover his paintings with a brown varniſh to give them the deſired mellowneſs and ſobriety of tone: *Unum*† *imitari nemo potuit quod abſolutâ opera atramento*

* Diſſert. 35. ο οφθαλμοις φιλον, &c. † Plin. XXXV. 35.

illinebat

illinebat ita tenui ut id ipſum repercuſſu claritas colorum excitaret, cuſtodiretque à pulvere et ſordibus, ad manum intuenti demum appareret. Sed et tum ratione magna ne colorum claritas oculorum aciem offenderet veluti per lapidem ſpecularem intuenti e longinquo: et eadem res nimis floridis coloribus auſteritatem occultè daret. I have already quoted Pliny's complaints that the Roman artiſts ſacrificed every thing to colouring; and in the following paſſage he praiſes the oppoſite ſtile. *Nicìæ* comparatur et aliquando præfertur Athenion Maronites, Glaucionis diſcipulus, et auſterior colore et in auſteritate jucundior, ut in ipſâ picturâ eruditio eluceat.* To what can this *Eruditio* apply, but to technical ſkill in the particular province of colouring?† The analogy as to colouring, as well as in other reſpects, between the Greek painters among the ancients, and the Roman and Florentine ſchools among the moderns on the one hand; and between the ancient Roman artiſts, and the Venetian and Flemiſh ſchools on the other, will be ſufficiently obvious.

* XXXV. 39.

† I would obſerve that Pliny (as it ſeems to me) generally applies the terms *durus, durior* where the colouring was chalky or the handling harſh. The term *auſterior* I think implies what the moderns would term chaſtity or ſobriety of colouring. Where the handling was ſmooth and laboured, it is implied in the *Commiſſura & Corruptela Colorum:* which latter expreſſion was alſo uſed for certain proceſſes in the mechanical mixture of colours.

Upon

Upon the whole therefore, I think, with reſpect to colouring, as employed upon *ſingle figures*, that as the ancients were fully as competent to judge of excellence herein as the moderns; as the expreſſions of the ancient connoiſſeurs are very warm in praiſe of the colouring of many of their painters; as they appear alſo to have attended very much to the art of colouring; and moreover, as probable evidence will be adduced that they attended to miniature painting, a conſiderable degree of merit may be allowed them in the uſe of the colours they poſſeſſed.

The duration of the art among the ancients and moderns ſeems nearly equal: in number, the modern artiſts I think are ſuperior. Some advantage however both in the preparation and the number of the modern colours, and (perhaps*) the introduction of oil painting may poſſibly have enabled the moderns to excel their predeceſſors in ſome ſmall degree;† but I think

* The ancient colours in freſque ſeem to ſtand better than the modern oil colours. Plutarch, in his life of Ariſtides, mentions the paintings in the temple of Minerva, which in his time (between five and ſix hundred years afterwards) retained their full luſtre. Montfaucon, in a paſſage already noticed, mentions the colours of an ancient ceiling, painted in freſque, which continued *en grande vivacité*. So alſo does the grand painting in freſque of the battle between Conſtantine and Maxentius, deſigned by Raphael, and painted by Julio Romano.

† The principal advantage of *oil* painting ſeems to be that, in conſequence of not drying ſo faſt, it enables the

I think the evidence will not permit us to rate that ſuperiority very high. With reſpect to colouring, *as a whole*, and independent of the other parts of the picture, it ſeems probable that the ancients did underſtand the effect of it: but we have not ſufficient reaſon to conclude that they attended ſo diſtinctly to this branch of the art, or attained to the ſame degree of perfection in the practice of it, as many of the moderns have done. It muſt, however, be obſerved, that we can judge of the merit of the ancient painters from two ſpecies of evidence alone, viz. *diſcovered antiques*, and *expreſſions in the works of ancient authors*; both of which are extremely defective: it is allowed by every ſkilful perſon, who has viewed the remains of ancient paintings, that none of them ſeem to be the performances of ſuperior artiſts, notwithſtanding much merit in the deſign and accuracy in the drawing, which indeed ſeems to have been habitual to almoſt every ancient artiſt. The beſt among theſe paintings (according to Sir Joſhua Reynolds) "the ſuppoſed marriage in the Aldrobandine palace," is evidently far ſhort of that degree of excellence undoubtedly implied in the deſcriptions of ancient authors, and which, from them, we are fairly led to expect.

Still more defective, if poſſible, is this laſt ſpecies of evidence: for we have no direct trea-

artiſt to recur to his piece, and touch and retouch the colouring more frequently, and at longer intervals, than freſque painting, or any water colours.

tiſe

tiſe remaining on the ſubject by any of the ancients, although many were compoſed by their artiſts. The paſſages from which we are to decide, are, either the curſory remarks of writers not expreſsly treating on the ſubject of painting, or the deſcriptions of thoſe who, at beſt, can rank but as amateurs of a faſhionable art. From theſe indeed we may pretty ſafely aſſert the degree of excellence which the paſſages imply, but we ſhould reaſon very inconcluſively, were we to *deny* them any higher or any other merit than appears to be ſtrictly contained in theſe ſcattered obſervations. Let any one for a moment place the modern painters in his mind, in the ſame ſituation as the ancients, and he will quickly decide on the truth of theſe remarks.

Chiaro-'Scuro, or the art of placing and proportioning light and ſhade in ſuch a manner as to produce a pleaſing effect, independently of any other circumſtance connected with the picture, has been commonly deemed a characteriſtic difference between the knowledge of ancient and modern painters. Indeed many of the earlieſt and beſt of the moderns, ſuch as Raphael, Julio Romano, Pouſſin, Domenichino, either did not underſtand or did not attend to this ſtriking part of the art, nor was the full effect of it known till the time of Rembrandt.

On this ſubject, the works of the ancients, now remaining, give little information: nor ſo

far as I can find do any one of them appear to exhibit indications that this branch of painting was either so well known or so much in vogue among the ancient artists, as to render the practice of it common among the performances of inferior painters, or such as were in common demand.

It must also be confessed that many of the passages usually adduced by the admirers of the ancients, as proofs of their knowledge in this respect, cannot fairly be taken as implying more than the shading necessary to give life and relief to single figures. These passages, however, it will be proper to cite, because, although they do not weigh much with me, others may deem them of more importance, and they will add to the mass of authorities respecting the state of the art of painting among the ancients.

Cicero, speaking of eloquence, says, *Sed habeat tamen illa in dicendo admiratio ac summa laus umbram aliquam et receſſum quo magis id quod erit illuminatum extare atque eminere videatur.**

Pliny says of a Jupiter, by Apelles,† *Digiti eminere videntur et fulmen extra tabulam esse:* and of Nicias,‡ *lumen atque umbras custodivit, atque ut eminerent e tabulis picturæ maximè curavit.* In this passage indeed it might be doubted, whether the first sentence does not mean more than mere relief, especially as this is mentioned afterward.

* De Orat. lib. III. † XXXV. 35.
‡ XXXV. 40.

To

To these may also be added the passages from Plutarch already quoted under the head of *colouring*, οι δε ζωγραφοι τα φωτεινα, &c. and δει χρωματων τα φαιδρα, &c. That from Maximus Tyrius ο οφθαλμοις φιλον μεν χρωματων, &c. And the σκιασαι ες δεον of Lucian.

Zeuxis, Polygnotus, Euphranor (says Philostratus*) *umbras etiam atque spiritus necnon recedentia atque eminentia suâ arte expresserunt.* The same author says of the picture of Venus, † that "the "goddess will not seem to be painted, but springs "from the canvas as if she would be pursued."

In paintings, says another author, ‡ the contour of the illumined part should be "blended "with and lost in the shade, for on this, joined "to the advantage of colouring, depend ani-"mation, tenderness, and the similitude to "truth."

I think it will be evident, on examination, that all the preceding quotations may relate merely to the light and shade of single figures, without involving what is now called the science of the Clair obscure. There are many observa-

* Ζευξις, Πολυγνωτος, Ευφρανωρ, το ευσκιον, &c. Vit. Apol. Tyan. lib. II. cap. 9.

† ου θελεται, &c. De Pict. Veneris, lib. II. p. 810. Webb, 101. The passage here quoted by Mr. Webb is in the ΥΜΝΗΤΡΙΑΙ. Virgines Canentes.

‡ Theages Pythagor. apud Stobæum, Webb, 102.

tions, however, among the writings of the ancients, which go very near to prove, that this branch of painting was underſtood among them: that well known paſſage of Pliny, for inſtance, already quoted, affords no ſlight preſumption to this purpoſe. *Tandem ſeſe ars ipſa diſtinxit, et invenit* lumen atque umbras *dedrentia colorum alternâ vice ſeſe excitante. Deinde adjectus eſt* ſplendor: *alius hic quam lumen. Quem quia inter hoc et umbram eſſet appellaverunt* tonon. The dark, the light, and the mezzotint are here evidently and accurately deſcribed.

Equally ſtrong is that expreſſion of Quintilian,* *(Zeuxis) Luminum umbrarumque rationem inveniſſe traditur.* This cannot well be otherwiſe tranſlated than by the *ſcience* of light and ſhade.

Among the enumeration of paintings, by various maſters, in Pliny, there are ſome which could only originate from a knowledge of the effect of light and ſhade in maſſes. Thus, by Echion, *Anus lampadas preferens.* Antiphilus, *Puero ignem conflante laudatus, ac pulchrâ alias domo ſplendeſcente, ipſiuſque pueri oræ.* Philiſcus, *Officinam pictoris, ignem conflante puero.*†

Hence

* Inſt. Orat. lib. XII. cap. 10.

† To theſe alſo may be added, the picture of Jupiter, by Apelles, where the lightning ſeemed detached from the picture *(fulmen extra tabulam eſſe).* This great painter was particularly famous for producing effect by the repreſentation

Hence, although I ſhould by no means agree with the Abbe Du Bos,* that the ancients at leaſt equalled the moſt celebrated of the moderns in th[illegible] part of the art, I cannot adopt the ſentiment [illegible]hat [illegible]he firſt authority in this kingdom, that [illegible]ur was entirely unknown to them. Sir Joſhua Reynolds obſerves,† "that what the "ancients appear to have moſt failed in is "compoſition, both in the art of grouping their "figures and the art of diſpoſing the light and "ſhadow in maſſes. It is apparent that this, "which makes ſo conſiderable a part of modern "art, was to them *totally unknown*. If the great "painters had poſſeſſed this excellence, ſome "portion of it would have infallibly been diffuſed, and have been diſcovered in the works of "the inferior rank of artiſts, ſuch as thoſe whoſe "works have come down to us, and which may

ſentation of lightning: *pingit et, quæ pingi non poſſunt, tonitrua, fulgura, fulgetraque.* Plin. XXXV. 35. I cannot help thinking this muſt have proceeded from a knowledge of, and a fondneſs for, the effect of light and ſhade in maſſes and contraſt.

* Quant au clair obſcure et à la diſtribution enchantereſſe des lumieres et des ombres, ce qui Pline et les autres eſcrivains de l'antiquitè en diſent eſt ſi poſitif, leur ecrits ſont ſi bien circonſtanciez et ſi vraiſemblable, qu'on ne ſauroit diſconvenir que les anciens n'egalaſſent du moins dans cette partie de l'art les plus grands peintres modernes. Reflexions Critiques, vol. I. p. 367.

† Notes to Maſon's Tranſlation of Freſnoy, p. 95.

" be conſidered as on the ſame rank with the " paintings that ornament our public gardens. " Suppoſing our modern pictures of this rank " only were preſerved for the inſpection of " connoiſſeurs two thouſand years hence, the " general principles of compoſition would be " ſtill diſcoverable in thoſe pictures; however " feebly executed, there would be ſeen an at- " tempt at an union of the figure with its ground, " ſome idea of diſpoſing both the figures and " the lights in groups. Now as nothing of this " appears in what we have of ancient painting, we " may conclude that this part of the art was to- " tally neglected, or more probably unknown."

So much of this extract as relates to grouping, I ſhall have occaſion to conſider preſently; as to the reſt, I think Sir Joſhua rates the merit of the ancient artiſts, whoſe paintings remain, ſomewhat too high in the ſcale of compariſon. Nor do the accounts of the places where theſe paintings have been found, warrant the ſuppoſition that they were thus ornamented at any conſiderable expence public or private. The generality of them conſiſt of ſingle figures; ſome of them of two or three figures—generally relieved by an uniform ground; and, except in (comparatively) a few inſtances (ſuch as the Aldrobandine Marriage, the Sacrifice, the Nymphæa, and a few paltry landſcapes) evidently deſigned as mere reliefs to a compartment, and anſwering, as near as may be, the

ſtuccoed

ſtuccoed ornaments in our modern rooms. Nor do any of them ſeem the works of artiſts equal in their day to thoſe at preſent employed on the painted ceilings of private houſes.*

That ſome technical knowledge of the effect producible by *maſſes* of light and ſhade was poſſeſſed by the ancients, appears to me indubitable from the paſſages adduced; to what extent it was carried, cannot now be aſcertained. In all probability they were much inferior in this reſpect to the moderns; otherwiſe, although much ſcience of this kind could hardly be expected from the trifling performances that remain, much more would have occurred on the ſubject, more largely dwelt on, and more preciſely expreſſed, among the obſervations of ancient authors on the beſt paintings of the ancient maſters.

Neither is there ſufficient evidence that the ancients were eminent in that other important branch of the *compoſition* of a picture, which conſiſts in diſtributing the figures and objects in *groups* or maſſes; not merely ſo as to prevent the appearance of confuſion, and aſſign to each figure the degree of prominence and action due to his reſpective importance in the ſtory, but in ſuch a manner alſo, that by their mutual connection with, and dependance on each other, no particular group, nor any ſingle figure therein, ſhall appear complete of itſelf, but as parts only,

* Such as thoſe in Portland Place for inſtance, Harley-ſtreet, &c. in London.

harmonizing

harmonizing together to ſuggeſt at once the idea of a whole, and direct the eye of the ſpectator to the point repreſented.

There are no examples of this difficult branch of the art among the remaining antiques: and, indeed, from the paucity of the figures introduced in the generality of theſe ancient paintings, there is little room to expect them. In the "Aldrobandine Marriage," nothing of this appears; and although there is an evident attempt at grouping in the "Sacrifice," and moſt of the figures are ſomewhat regularly diſpoſed in two large maſſes,* there is nothing like a connection or ſubordination in the parts of the picture, or any tolerable union of the figures with each other, or the ground.

But what ſtill more inclines me to doubt whether the ancients attained any degree of eminence herein, is, that among the many paintings of their great maſters, enumerated by Pliny, Lucian, or Philoſtratus, I do not find any of them praiſed for this ſpecies of excellence. This indeed may as well ariſe from want of knowledge in the writer, as of ſkill in the artiſt.

* The principal part of the figures in this picture are diſtributed in two triangular groups, formal, but not unpleaſant. The perſpective tolerably well preſerved. The copy in the Voyage *Pittoreſque de Sicile*, is not quite accurate, and more favourable than the print in the collection of Herculanean Antiquities, publiſhed by order of the king of Naples.

We

We are not therefore to conclude from thence that they were entirely ignorant of ordonnance; for it was hardly poſſible to paint, as they did, pictures containing a multitude of figures,* without being compelled to adopt ſome artificial diſpoſition of them. Indeed, this actually appears to have been technically attended to by them whatever might be their comparative excellence in it, for Apelles is expreſsly aſſerted by Pliny† to have been inferior to Melanthius in compoſition *(de diſpoſitione)*. And Quintilian‡ remarks that this ſame Melanthius was eminent for his *ſcience* in painting, as the word ſeems to me to import. Theſe however are the only paſſages that have occurred to me on this particular department of the art, and they ſhew, in a general way merely (but indubitably) that it was attended to as a technical diviſion of painting, but how far cultivated, or to what degree of excellence it was carried, the preſent ſtate of our knowledge will not enable us to determine.

* One of their paintings (by Ariſtides the Theban), for inſtance, mentioned by Pliny, is ſaid to have contained one hundred figures: this unweildy number muſt have been offenſive, if they were not grouped with ſome ſkill.

† Melanthio de Diſpoſitione cedebat; Aſclepiodoro de Menſuris.

‡ Nam curâ Protogenes, *ratione* Pamphilus ac Melanthius, facilitate Antiphilus, concipiendis viſionibus (quas φαντασιας vocant) Theon Samius. De Inſt. Orat. XII. 10.

By

By INVENTION* I mean the talent of introducing ſuch perſons, objects and circumſtances into a picture, as are requiſite to tell the ſtory in the completeſt manner, and moſt effectually to impreſs the idea intended to be conveyed.

From the connection between the ſiſter arts of poetry, painting and ſculpture, in this reſpect, and the admirable performances of the ancients in the other two departments of the fine arts, we might reaſonably have conjectured that the ancient painters were not deficient in invention, although no ſpecific proof of excellence in this reſpect had been tranſmitted to us.

Many of the inſtances indeed already adduced, under the heads of deſign and expreſſion, may be

* Sir Joſhua Reynolds (Notes to Maſon's Freſnoy, p. 75.) includes *compoſition*, under *invention*. "But here "begins what in the language of painters is called INVENTION, which includes not only the compoſition, or the "*putting the whole together*, and the diſpoſition of every "individual part, but likewiſe the management of the "back ground, the effect of light and ſhadow, and the "attitude of every figure or animal that is introduced, or "makes a part of the work.

"Compoſition, which is the principal part of the invention of a painter, is by far the greateſt difficulty he has "to encounter."

This is not the *uſual* meaning of invention. Ordonnance or compoſition being generally conſidered as a ſeparate diviſion of the art of painting. Ingenuity and ſkill indeed are here required, but the difference ſeems to be that ingenuity (as in compoſition) is employed in the arrangement of materials already collected; invention in diſcovering and creating the materials themſelves.

regarded

regarded as proofs that the ancients were eminent alſo as inventors; for it is not abſolutely neceſſary to the exertion of this talent that an action ſhould be deſcribed by means of a multitude of objects.* On the contrary, the introduction of more figures or circumſtances than are neceſſary to produce the full effect of the ſtory, are deciſive proofs that the artiſt is deficient in a qualification which comprehends as well the rejection of unneceſſary as the introduction of parts neceſſary to the tranſaction. That invention, therefore, which is deſtitute of taſte and judgment, can lay no great claim to our approbation.

Protogenes ſeemed perfectly aware of this. In his picture of a ſatire, leaning againſt a pedeſtal, he introduced on the top of the pillar a partridge painted ſo exquiſitely that the eyes of the ſpectators were diverted from the principal figure. The painter obſerving this, defaced the object of ſo much attention.†

The contrivance of Timanthes, in his Iphigenia, I have already noted, and I do not ſee any ſufficient reaſon to diſſent from the praiſes it has hitherto received. Nor ſhould the picture of the ſleeping Cyclops, by the ſame painter, paſs without commendation. *Sunt et alia ingenii ejus exemplaria,*‡

* The Laocoon of the ancients, and the group in Guy's hoſpital, by Mr. Bacon, are inſtances of this.

† Satyrus Anapavomenos. Plin. XXXV. 35. Strabo, lib. XIV. p. 652. Και αι τε Προτογενε, &c.

‡ Plin. XXXV. 35.

veluti

veluti Cyclops dormiens, in parvulâ tabellâ: cujus et ſic magnitudinem exprimere cupiens, pinxit juxta Satyros, Thyrſo pollicem ejus metientes. Atque in unius hujus operibus intelligitur ſemper plus quam pingitur, et cum ars ſumma ſit, ingenium *tamen ultra* artem *eſſe.* This is an evident diſtinction between, and a judicious preference given to genius and invention over mere technical acquired ſkill.

The picture of Hercules ſtrangling the ſerpents in his cradle, by Zeuxis,* is well imagined, and ſeems to have furniſhed the idea to the firſt of our modern artiſts, Sir Joſhua Reynolds, who has repreſented the ſame ſubject, *Magnificus ejus eſt Jupiter in Throno, adſtantibus diis, et Hercules Infans Dracones ſtrangulans; Alcmenâ matre coràm pavente et Amphitryone.* It may be obſerved that the introduction of the deities in this picture (or in a ſubject of this kind) was by no means improper in a painter, who not only believed in their exiſtence, but in all probability gave credit to the ſtory itſelf.

A remark of the ſame kind may be made on the ſubject of a picture by Ætion, deſcribed by Lucian,† and from his deſcription painted by Raphael. It repreſented the marriage of Alexander and Roxana; and we may venture to agree in opinion with the Abbe du Bos‡ reſpect-

* Ubi ſup.

† In his Herodotus, *και Αετιωνα φασι τον Ζωγραφον*, &c.

‡ Reflexions Critiques, vol. I. p. 360.

ing

ing it, that for the charms of invention and elegance of allegory it exceeds the moſt lively productions of Albani.

Other inſtances might perhaps be collected in ſupport of the pretenſions of the ancient painters to invention, were it neceſſary to do ſo. But it will be ſufficient perhaps to obſerve, in addition to what has already been urged on this ſubject, that as invention is rather a natural endowment than an acquired talent, and as the ancients univerſally ſeem at leaſt equal to the moderns in the gifts of genius and good ſenſe, we cannot but admit, on their part, an equality with ourſelves, ſo far as invention is concerned.

Very nearly connected with the ſubject of invention is that of COUTUME: by which I mean an attention to probability (with reſpect to times, places, objects, perſons, and circumſtances) in the tranſaction repreſented.

The ancient paintings now remaining, indeed, ſo far from exhibiting any proofs of attention to this important branch of the art, are full of groſs violations of probability, and repreſentations of impoſſible connection. But I lay very little ſtreſs on theſe inſtances; firſt, becauſe they are ſo evidently the performances of artiſts of no repute, and in the very decline of taſte and good ſenſe: ſecondly, becauſe none of them, to which this objection can be made, are regular repreſentations of any perſon or tranſaction, but merely

merely fancy pieces; and thirdly, becauſe as they were (for the moſt part) manifeſtly intended as ornaments to apartments, the taſte of the owner, and not of the artiſt, would of courſe be chiefly conſulted. Nothing, however, can be more clear than that the ancients required an attention to probability in the works of their artiſts; and from the manner in which their writers expreſs themſelves on the ſubject (not ſo much recommending the practice, as taking it for granted), we may reaſonably conclude that their beſt painters were ſeldom guilty of any groſs violation of the coutume. *Sint ficta ſimillima veris* was an apothegm generally known, and where known, muſt have been univerſally admitted.

Indeed the principles of the coutume in painting are well expreſſed, and illuſtrated by Horace in the ſubſequent well known paſſage, and in ſuch a manner alſo, that this alone would afford a probable preſumption that the ancient connoiſſeurs were in the habit of expecting a ſtrict attention to propriety in this reſpect.

> Humano capiti cervicem pictor equinam
> Jungere ſi velit, et varias inducere plumas
> Undique collatis membris, ut turpiter atrum
> Deſinia in piſcem mulier formoſa ſupernè:
> Spectatum admiſſi, riſum teneatis amici?
> Credite, Piſones, iſti tabulæ fore librum
> Perſimilem, cujus, velut ægri ſomnia, vanæ
> Fingentur ſpecies. *

* De Art. Poeticâ. ſub Init.

The

The ſame ſentiments are expreſſed by Ælian, *Statuas et imagines* (ſays he) *quas nobis ars fictorum exhibet non oſcitanter aut obiter ſpectare ſoleo. Nam in his etiam ars manuaria judicium aliquod ſapientiamque adhibet. Atque id ſic ſe habere cum ex multis aliis conjici poteſt tum ex eo potiſſimum quod nemo pictorum aut plaſtarum auſus eſt unquam muſis filiabus Jovis adulterinas atque alias ſpecies effingere: neque quiſquam opificum tam eſt à ratione alienus, qui eas armatas exhibuerit.*

Still more directly to the purpoſe is the following very ſenſible paſſage from Vitruvius, whoſe good taſte and judgment ſeems to have been greatly offended at the violations of probability which were beginning to gain ground in his time. *Neque picturæ* (ſays he*) *probari debent quæ non ſunt ſimiles veritati; nec ſi factæ ſunt elegantes ab arte ideo de his ſtatim debet repentè judicari, niſi argumentationis habuerint rationes ſine offenſionibus explicatas. Etenim enim Trallibus cum Apaturius Allabandeus eleganti manu finxiſſet ſcenam in minuſculo theatro quod* εκλεσιαστηριον *apud eos vocitatur, in eâque feciſſet pro Columnis ſigna Centauroſque ſuſtinentes Epyſtilia, Tholorum rotunda tecta, faſtigiorum prominentes verſuras, coronaſque capitibus leoninis ornatas; quæ omnia ſtillicidiorum e tectis habent rationem; præterea ſupra eam nihilominus epiſcenium in quo Tholi pronai ſemifaſtigia omniſque tecti variis picturis fuerat*

* Lib. VII. cap. 5.

ornatus—itaque cum aſpectus ejus Scenæ propter aſperitatem eblandiretur omnium viſus, et jam id opus probare fuiſſent parati, tum Licinius Mathematicus prodiit et ait Allabandeos ſatis acutos ad omnes res civiles haberi, ſed propter non magnum vitium, indecentiæ inſipientes eos eſſe judicatos; quod in Gymnaſio eorum, omnes quæ ſunt ſtatuæ, ſunt cauſas agentes; in Foro autem, diſcos tenentes, aut currentes ſeu pila ludentes. Ita indecens inter locorum proprietates ſtatus ſignorum publicè civitati vitium exiſtimationis adjecit. Videamus etiam nunc ne Apaturii Scena efficiat et nos Allabandeos aut Abderitas. Quis enim veſtrum domos ſupra tegularum tecta poteſt habere aut Columnas, ſeu faſtigiorum explicationes? Hæc enim ſupra contignationes ponuntur, non ſupra tegularum tecta; ſi ergo quæ non poſſunt in veritate rationem habere facti, in picturis probaverimus, accedemus et nos his civitatibus, quæ propter hæc vitia inſipientes ſunt judicatæ. Itaque Apaturius contra reſpondere non auſus eſt; ſed ſuſtulit ſcenam et ad rationem veritatis commutatam poſtea correctam approbavit. There is at leaſt as much reaſon to cry out in the preſent day, as Vitruvius did at the end of this paſſage *Utinam Dii immortales feciſſent ut Licinius reviviſceret et corrigeret hanc amentiam.* The whole of the chapter from whence this extract is taken, is a diſſertation on the coutume in painting and architecture.

But beſide the ſpeculative acquieſcence in the rules of the coutume among the ancients, there are

are not wanting inſtances of attention to them in practice, ſuch as the contrivance of Nealces,* who *cum prælium navale Ægyptiorum et Perſarum pinxiſſet, quod in Nilo cujus aqua eſt mari ſimilis factum volebat intelligi, argumento declaravit quod arte non poterat, aſellum enim in littore bibentem pinxit, et crocodilam inſidientem ei.* Mr. Webb, † with great truth, remarks on this artifice, that a *modern* artiſt with the ſame view would have planted at one end a river-god with water iſſuing from ſeven urns, with no ſmall conceit of his erudition. In fact this clumſy expedient has been the reſource of the greateſt among the modern artiſts on ſimilar occaſions. Thus Raphael, in his painting of the paſſage through Jordan, has repreſented the river in the form of an old man dividing the waters. Pouſſin has done the ſame as to the very river in queſtion, the Nile, in the picture which repreſents the diſcovery of the infant Moſes; and an artiſt of the firſt merit in the preſent day ‡ has deſcribed the river Thames under the ſame venerable form, among other allegorical repreſentations equally objectionable. Whether the ancient

* Plin. XXXV. 40. † Inquiry, 199.

‡ Mr. Bacon, on the monument of Lord Chatham in Weſtminſter Abbey. This particular fault is obſervable alſo among the ſeries of paintings in the room of the ſociety of arts at the Adelphi.

painters put in practice a greater share of good sense with respect to coutume, than the moderns, cannot now indeed be accurately determined; hitherto the advantage seems to be in favour of the former, nor will the opinion of the superiority of the ancients herein be diminished by an enumeration of some other instances of the contrast from the works of modern artists. Nor is it at all necessary for this purpose to have recourse to names of inferior note, since the most celebrated of modern painters, from Raphael to Sir Joshua Reynolds, have been guilty of such flagrant breaches of probability and propriety, as would appear astonishing to those who are not in the habit of expecting them.

When Raphael, in his cartoons, introduces monks and Swiss guards: when he puts into a boat more figures than it is evident the boat could actually contain: when in the chastisement of Heliodorus, who attempted to despoil the temple at Jerusalem, Pope Julius the Second is depicted as being present: when in the donation of Constantine in the Vatican a naked boy is placed conspicuously in the foreground, astride upon a dog, in the immediate presence of the pope and the emperor: when Venetian senators are introduced while Pope Alexander excommunicates Barbarossa: when Aristotle, Plato, Dante and Petrarch are brought together in the school of Athens: to omit the lesser improprieties of shoeless apostles,

apoſtles, &c. every perſon muſt acknowledge that ſuch offences as theſe againſt truths ſo obvious, if they do not ariſe from a defect of underſtanding, are inſtances of inexcuſable careleſſneſs.

In like manner, when the ſame great maſter paints the dreams of Joſeph and his fellow-priſoner in circles over their heads; when ſimilar contrivances to expreſs future events are uſed by Albani, Parmeggiano and Fuſeli, is it not evident that no poſſibility can make the fiction true? that real and feigned exiſtences are unnaturally introduced in one narration?

When Polidore chooſes to repreſent the death of Cato, and expoſes to the ſpectator the hero of the piece, with his bowels guſhing out; when Paul Veroneſe, at a banquet, painted with his uſual magnificence, places before us a dog gnawing a bone, and a boy making water: however ſuch diſguſting circumſtances may be forgiven in the *chef d'œuvre* of a Michael Angelo, had he repreſented theſe inſtead of the horrible figures in his day of judgment, the performance of an inferior artiſt cannot atone for them.

So alſo, when one of the firſt-rate among the modern painters already mentioned* introduces Benédictine monks at the marriage of Cana; when in a picture of the crucifixion he puts the Roman ſoldiers in the jerkins of the ſixteenth cen-

* Paul Veroneſe.

tury, and adorns their heads with turbans; when Guido, in a painting of Jeſus appearing to his mother after his reſurrection, places St. Charles Borromèe in a kind of deſk in the back ground, as witneſs to the interview; when Tintoret, at the miraculous fall of manna, arms the Iſraelites with fuſils; and Corregio appoints St. Jerome as the inſtructor of the child Jeſus: common ſenſe revolts at the impropriety; and we are compelled to exclaim *quicquid oſtendas mihi ſic, incredulus odi.*

The mythological taſte of the *learned* Pouſſin is well known; but Reubens ſeems to claim the merit of having preſented to the world a ſtill greater number of ſupreme abſurdities in this learned ſtyle: nor is it eaſy to conceive a more heterogeneous mixture of circumſtances real and imaginary, ſacred and profane, than the Luxembourg* Gallery, and the other works of that great maſter perpetually exhibit.

But

* In the Luxembourg Gallery (among other inſtances) when Mary de Medicis eſcapes from the caſtle of Blois, ſhe is conducted by Minerva and the Duke D'Eſpernon. In the ſame collection, the city of Lyons goes to meet the queen who appears in the air with her ſon, ſomewhat like the kings of Brentford in the Rehearſal.

Le Seur, in his martyrdom of St. Stephen, adorns him with a rich cope, which had Stephen been a biſhop would have been ſufficiently well. He admits alſo the abſurdity of repreſenting him as perfectly inflexible in his joints as they carry him off.

Carlo

But it would be too tedious to enumerate all the great painters of modern ages who have egregiouſly offended againſt every precept of common ſenſe in their admired productions; I ſhall therefore no longer diſturb the aſhes of the dead, but quit this part of my ſubject with a few obſervations on living artiſts.

When ſo great an authority as Sir Joſhua Reynolds* contends for the rejection of common ſenſe in favour of ſomewhat that he terms a higher ſenſe; when he laments, indirectly, that art is not in ſuch high eſtimation with us, as to induce the generals, law-givers, and kings of modern times to ſuffer themſelves to be repreſented naked, as in the days of ancient Greece; when he defends even the ridiculous aberrations from poſſibility which the extravagant pencil of Reubens has ſo plentifully produced; it is not ſurprizing that the artiſts of the preſent day ſhould be led to reject the company of common ſenſe; or that Sir Joſhua's performances ſhould furniſh examples of his own precepts.

Carlo Maratti introduces Apollo playing on the violin to Minerva who comes to viſit him; and Luca Giordano paints Tarquin in the Italian habit of the ſixteenth century. The introduction of little loves and cherubim in paintings of real tranſactions is almoſt too common to notice.

* Reynolds's Diſcourſes, 8vo. p. 286.

Mrs. Siddons is repreſented by Sir Joſhua in the character (as it is ſaid) of the tragic muſe: ſhe is placed in an old faſhioned arm chair; this arm chair is ſupported by clouds, ſuſpended in the air; on each ſide of her head, is a figure, not unapt to ſuggeſt the idea of the attendant imps of an enchantreſs: of theſe figures, one is ſuppoſed to repreſent comedy, and the other tragedy; Mrs. Siddons herſelf is decently attired in the faſhionable habiliments of twenty or thirty years ago.

If this be a picture of the tragic muſe, ſhe ought not to appear in a modern dreſs, nor ought ſhe to be ſeated in an old arm chair. If this be a portraiture of Mrs. Siddons, ſhe has no buſineſs in the clouds, nor has ſhe any thing to do with her aërial attendants. If this be Mrs. Siddons in the character of the tragic muſe, the firſt ſet of objections apply, for ſhe is depicted out of character: if this be the tragic muſe in the ſimilitude of Mrs. Siddons, the ſecond objections apply, for ſhe is placed in a ſituation where Mrs. Siddons could never be.

In the death of Dido Sir Joſhua introduces her ſiſter lamenting over the corpſe of the unfortunate queen—this is poſſible: but he has alſo introduced Atropos cutting Dido's hair with a pair of ſciſſars, a being equally real and apparent in the painting with Dido or her ſiſter: this appears to me a groſs offence againſt mythological

logical probability: nor is it the only offence againſt the coutume with which that picture is chargeable.*

It is needleſs to dwell on the anachroniſms and improbabilities of Weſt, in his painting of the Scotch king Alexander, hunting: or on the repreſentation of dreams by Fuſeli: or to notice at length the well known abſurdities of his night mare or his Ghoſt of Hamlet: nor ſhall I take up the time of the Society with a particular examination of poſſible and impoſſible events—of ſacred and profane mythology—of perſons real and allegorical—tranſactions, ſerious and ridiculous—ſo pompouſly diſplayed in Mr. Barry's ſeries of paintings at the Adelphi: to all of us theſe groſs violations of the plaineſt principles of common ſenſe are well known, and I hope they will be the laſt inſtances of improbable concomitance with which the art of painting in this country will be diſgraced.

* I allude to the circumſtances under which a cloud is introduced behind Dido's ſiſter.

In Sir Joſhua's painting of the infant Hercules among other objectionable circumſtances that occur to my recollection are, the introduction of the lion's ſkin, ſo eaſy to be miſtaken for an anachroniſm of the Nemean lion's—the introduction of perſonages unneceſſary to the ſtory—the near approach of one of the attendants to the dreadful mouths of the ſerpents—and the diſguſting antitheſis of the front and back view of the naked children.

There

There is one other breach of the coutume however common among painters, more groſs and offenſive than any of the inſtances hitherto alledged, I mean the perpetual and unneceſſary diſplay of the naked figure. I ſhall not ſtay to inquire whether more ſkill can be ſhewn in painting the human body clothed or unclothed. If the perſonages introduced in any picture are more naked in the repreſentation than can be juſtified by the probability of times, perſons, places, and circumſtances, it is a breach of the coutume proportionate to the deviation. *This* fault however is ſo common, as hardly to be noticed: ſo ſlight indeed, when compared with that general taſte for voluptuous imagery and obſcene repreſentation, which has ſo long diſgraced the art of painting in every ſtage of its progreſs, that ſcience and morality are callous to the *ſlight* offence.

This depravity of imagination—this proſtitution of the pencil, to the baſe purpoſes of laſcivious inclination, was a ſubject of much complaint among the ancients.* Nor is there leſs

* To what purpoſe ſhall we erect temples to chaſtity, ſays Propertius?

Quæ manus obſcœnas depinxit prima Tabellas,
Et poſuit caſtâ turpia viſa domo;
Illa, puellarum ingenuos corrupit ocellos,
Nequitiæque ſuæ, noluit eſſe rudes!
Ah! gemat, &c.

Propert. El. L. II. E. V. ver. 219.

Fuit

leſs reaſon to complain in modern times, that this delightful art, which might be employed in exciting the nobleſt ſentiments, and become ſubſervient to the beſt intereſts of ſociety, ſhould ſo often be exerciſed upon ſubjects ſolely calculated to pleaſe the eye of the voluptuary and debauchèe. It is hardly poſſible to paſs through any admired collection, without meeting with ſome of theſe; of which, however excellent the performance may be, the common feelings of decency and morality (if we are neither profeſſed

Fuit et Arellius Romæ celeber paulo ante divum Auguſtum; niſi flagitio inſigni corrupiſſet artem, ſemper alicujus feminæ amore flagrans, et ob id deas pingens, ſed dilectarum imagine. Itaque in picturâ ejus ſcorta numerabantur. Plin. XXXV. 37.

I agree entirely with the following note of Brotier, whoſe edition of Pliny I uſe. Pictoribus poetiſque vulgare hoc vitium, homine ſemper indignum. Hujuſmodi libidines in ſuâ villâ non eſſe pictas ſibi gratulatur Sidonius Apollinaris, Epiſt. II. 2. *Non hic per nudam pictorum corporum pulchritudinem turpis proſtat hiſtoria, quæ ſicut ornat artem, ſic devenuſtat artificem.* Plin. per Gabr. Brotier, 12mo. vol. VI. p. 381.

Whatever the private practice of the ancient painters might have been, we excel them in the enjoyment of a public ſeminary, under the patronage of the firſt names in the country: in which, the young votaries of the graphic art are taught to admire and delineate the unveiled beauties of a proſtitute, hired for the purpoſe of exhibiting in the beſt light, *the female naked figure.*

artiſts

artiſts nor connoiſſeurs) prevent us from viewing them without a mixture of diſguſt.

Et Pudor averſos texit velamine vultus.*

I have dwelt thus long upon the ſubject of coutume becauſe I deem it of great importance to the perfection of the art; and the breach of it, the moſt palpable fault of the ſuperior painters of modern times: ſo far as the obſervations relate to the preſervation of public decency, I hope and truſt they will meet the concurrence of every friend to the welfare of ſociety.

It has been doubted, whether the ancients were acquainted with the ſcience of PERSPECTIVE. And indeed if the remains of ancient painting were alone to decide the queſtion, it muſt be determined againſt them; for the works of the ancient painters now in the poſſeſſion of the moderns, afford no proof of attention to the rules of perſpective equal to the performances of a modern ſign painter. The picture of the "Sacrifice," before-mentioned, among the Herculanean antiquities, and the fourth of the prints which Bellori has publiſhed and deſcribed, taken from the paintings in the ſepulchre of the Naſonii, are barely tolerable: but the other landſcapes (almoſt the only remaining antique paintings which admit of perſpective) are groſsly defective in this particular. So much ſo indeed,

* Abbè de Marſy.

that

that conſidering the late period* when landſcape painting was introduced among the ancients, together with this manifeſt imperfection in point of perſpective, of ſuch as are yet extant, we cannot help ſuſpecting the inferiority of the ancients in this reſpect. In perſpective, as in Chiaro 'ſcuro, had good practice been common, ſome traces would have been diſcovered in the works of their loweſt artiſts.

And yet ſome general knowledge of the principles, and ſome degree of attention to the practice of perſpective, cannot well be denied to the ancients. They were good mathematicians.† They were excellent architects;‡ ſome of them are celebrated for their ſkill in ſcene painting.‖ Geminus, the Rhodian, cotempo-

* Non laudando et Ludio qui divi Auguſti Ætate primus inſtituit amæniſſimam parietum picturam, villas et porticus, ac topiaria opera, lucos Nemora, Colles, Euripos, amnes, &c. This *may* indeed imply that he was the firſt who painted the walls of houſes, but the other appears to me the true meaning.

† Witneſs, Archimedes, Diaphantus, Euclid, &c.

‡ This is ſufficiently evident: it has often occurred to me, however, that the rules of perſpective are reverſed in the reſpective ſituations of the five orders: the niceſt work and that which will bear the minuteſt inſpection (the Ionic and Corinthian), are placed at the top, and the doric order at the bottom of a building.

‖ Agatharcus, Democritus, Anexagoras. Vitr. præf. ad, lib. VII. Alſo Claudius Pulcher. Plin. XXXV. 7. I ſhall have occaſion to quote theſe paſſages at length.

rary

rary with Cicero (as I have already obſerved), was the author of an expreſs Treatiſe on Perſpective, as were alſo, Euclid, Heliodorus Lariſſeus, Agatharcus, and his diſciples Democritus and Anexagoras. And the quotations I am about to adduce will render it extremely probable that an attention to perſpective was expected in the works of the ancient artiſts.

Plato, in his dialogue entitled the Sophiſts, obſerves that "painters and ſculptors attempt "to preſerve the real proportion of beautiful "objects. You know that thoſe which are placed "in a certain point of elevation, would appear "to us too ſmall, and others placed lower, too "large; the one being ſeen near at hand, the "others at a diſtance. Hence artiſts at preſent "pay no regard to the real truth, nor do they "give to their figures their real ſize, but thoſe "proportions only which will conduce to a "beautiful effect."*

Agatharcus (ſays Vitruvius†) *primum Athenis Æſchylo docente tragediam ſcenam fecit; et de eâ re commentarium reliquit. Ex eo moniti, Democritus et Anexagoras, de eadem re ſcripſerunt, quemadmodum oporteat ad aciem oculorum radiorumque extenſionem*

* Edit. Steph. tom. I. p. 235. This paſſage is alſo noticed by the Abbè Salier in his paper on the perſpective of the ancient painters and ſculptors. Mem. de l'Acad. des Inſcrip. VIII.

† Præf. ad, lib. VII.

certo

certo loco centro conſtituto ad lineas naturali ratione reſpondere: uti de incertâre certæ imagines Ædificiorum in ſcenarum picturis redderent ſpeciem; et quæ in directis pleniſque frontibus ſint figuratæ, alia abſcedentia alia prominentia eſſe videantur. This paſſage is deciſive to prove that perſpective was reduced to a ſcience among the ancient artiſts. The paſſage herein before quoted from Vitruvius, under the diviſion of the coutume, furniſhes another proof of ſkill in perſpective ſcene-painting. So alſo does the inſtance of the bull, by Pauſias, painted in front on a black ground and foreſhortened.

Pliny alſo notices a ſcene-painting with much commendation,* *Habuit et ſcena ludis Claudii Pulchri magnam admirationem picturæ cum ad tegularum ſimilitudinem corvi decepti imagine advolarent.* Indeed the ancients appear to have arrived at conſiderable ſkill in the management of their ſcenes; which conſiſted like ours, both of ſcenes to draw aſide, and ſcenes in parts jointed, ſuch as are uſed in our pantomimes. *Scena aut verſilis erat, aut ductilis. Verſilis tunc erat, cum ſubitò tota machinis quibuſdam convertebatur et aliæ picturæ faciem oſtendebant. Ductilis tunc cum tractis tabulatis hac atque illac ſpecies picturæ nudabatur interior.*†

* Plin. XXXV. 7.

† Servius ad verſ. 24. lib. IVti. Georgic.

I have

I have already obſerved that Appelles is ſaid to have been inferior to Melanthius in compoſition, and to Aſclepiodorus in perſpective; the paſſage (which I think will bear no other meaning) is as follows:* *Melanthio de diſpoſitione cedebat, Aſclepiodoro de menſuris, hoc eſt quanto quid à quo diſtare deberet.*

The ſimilar expreſſions of Zeuxis,† and Philoſtratus‡ appear to me to require the ſame explanation.

I conclude therefore, that the ancient painters, eſpecially the firſt rate of the artiſts, and thoſe employed in painting ſcenes for exhibitions at public games, &c. muſt have attended to and poſſeſſed conſiderable knowledge of the ſcience of perſpective; nor indeed could the eye have been ſo perpetually inured to the repre-

* Plin. XXXV. 35.

† τας μεγεθους τον λογον και την των μετρων προς το ολον ισοτητα και αρμονιαν magnitudinis rationem et menſurarum totius operis æqualitatem atque harmoniam. Lucian. Zeuxis.

‡ "How pleaſing, ſays Philoſtratus, is the art of the "painter: for having manned the walls with armed "ſoldiers, he preſents ſome entire, ſome half figures: of "ſome we ſee the breaſts, now the helmets, and laſt of all "the ſpears. This is proportion young man (αναλογια "τουτα ω παι) for the objects muſt thus ſteal from the eye "as it follows the ſeveral groups through their proper "gradations." Εδν το σοφισμα τε Ζωγραφε, &c. Philoſt. lib. I. p. 768. Webb, 112. The paſſage here quoted by Mr. Webb is in the Menæcius.

ſentation

ſentation of objects, and theſe frequently ſo numerous in one picture, without acquiring, almoſt imperceptibly, a conſiderable degree of ſkill in the perſpective diſpoſition of them. It is certain however that the inferior artiſts among the moderns are much ſuperior, in this reſpect, to thoſe of the ſame claſs among the ancients.

We have very few means of deciding accurately concerning the merit of the ancients in PORTRAIT PAINTING; which appears however to have been much practiſed by the moſt eminent among the ancient artiſts. Nor indeed is it likely that that branch of the art ſhould be neglected at any period of the progreſs of painting, to which the origin of the art itſelf* is with great probability aſcribed.

Portrait painting ſeems to have been a principal employment of the firſt artiſt whom the ancients have to boaſt of. Alexander is ſaid to have permitted no painter but Apelles, and no ſculptor but Phidias to take his likeneſs;† and

* And indeed of modelling. Dibutades Sicyonius figulus primus invenit Corinthi filiæ operâ. Quæ capta amore Juvenis illo abeunte peregrè, umbram ex facie ejus ad lucernam in pariete lineis circumſcripſit: quibus pater ejus impreſſâ argillâ typum fecit et cum ceteris fictilibus induratum igni propoſuit. Plin. XXXV. 43.

† Quint. Curt. lib. II. cap. 6. Plut. vit. Alex. Plin. XXXV. 36. Alexandrum et Philippum quoties pinxerit enumerare ſupervacuum eſt.

Pliny particularizes ſeveral inſtances of the ſkill of Apelles as a portrait painter.*

Apelles, however, was far from being the only portrait painter of eminence even in his day; for his cotemporary Ariſtotle, alluding to portrait painters, ſays, that Polygnotus flattered, Dionyſius adhered to truth, and Pauſon made his likeneſſes inferior to the originals.† Nor was portrait painting leſs in vogue among the Romans than among the Greeks. Marcus Varro appears from a paſſage in Pliny (if I underſtand it aright) to have publiſhed a book with the portraits of ſeven hundred illuſtrious men;‡ and Lala,

* Plin. XXXV. 36. Imaginem adeo ſimilitudinis indiſcretæ pinxit ut (incredibile dictu) Apion Grammaticus ſcriptum reliquerit, quemdam ex facie hominem addivinantem (quos metopoſcopos vocant) ex iis dixiſſe, aut futuræ mortis annos aut præteritæ. Non fuerat ei gratia in comitatu Alexandri cum Ptolomæo: quo regnante Alexandriam vi tempeſtatis expulſus, ſubornato fraude plano regio invitatus ad cænam venit: indignantique Ptolomæo, et vocatores ſuos oſtendenti, ut diceret à quo eorum invitatus eſſet, arreptoque carbone extincto è foculo, imaginem in pariete delineavit, agnoſcente vultum plani rege ex inchoato protinus. Pinxit et Antigoni regis imaginem, &c. &c.

† Poetics. κεφ. 6. Πολυγνωτ@ μεν κρειττους, Παυσον δε χειρους; Διονυσι@ δε ομοιους εικασε.

‡ Imaginum amore flagraſſe quoſdam, teſtes ſunt et Atticus ille Ciceronis edito de his volumine, et Marcus Varro

Lala,* a female artiſt, who painted at Rome, is celebrated for the expedition with which ſhe painted; and her ſkill moreover is ſaid to have been ſuch as entitled her to a higher price than was paid to the two moſt famous portrait painters of that day: which implies that portrait painters were numerous, and the practice flouriſhing. Lala was chiefly employed on female portraits, and a picture of hers is particularly noticed wherein ſhe painted herſelf at a looking glaſs. The large portrait upon canvaſs, which Nero ordered to be painted of himſelf, one hundred and twenty Roman feet in height, has already been noticed, and the ſubſequent paſſage in Pliny reſpecting Nero's freed man, contains an inſtance of the

Varro benigniſſimo invento, inſertis, voluminum ſuorum fecunditati, non nominibus tantum ſeptingentorum illuſtrium, ſed et aliquo modo imaginibus, non paſſus intercidere figuras, aut vetuſtatem ævi contra homines valere. Inventor muneris etiam diis invidioſi, quando immortalitatem non ſolum dedit, verum etiam in omnes terras miſit, ut preſentes eſſe ubique et credi poſſent. This paſſage appears to me to imply more than a *verbal* deſcription of the perſons mentioned by Varro.

* Lala Cyzicena perpetua virgo Marci Varronis juventâ Romæ et penecillo pinxit et ceſtro in ebore; imagines mulierum maximè, et Neapoli anum in grandi tabulâ: ſuam quoque imaginem ad ſpeculum. Nec allius velocior manus in pictura fuit: artis verò tantum ut multum manipretio antecederet celeberrimos eadem ætate imaginum pictores Sopolin et Dionyſium quorum tabulæ pinacothecas implent.

public uſe of portrait painting, which fully proves this branch of the art to have been very faſhionable at that period.*

In the drawing and colouring of ſingle figures the ancients (as appears from the preceding pages) muſt be allowed equal merit with the moderns, and the paſſages juſt quoted will furniſh no improbable ground of conjecture that they were equally ſucceſsful in expreſſing the reſemblances of perſons. Spirit and animation, eaſe and dignity, the ancient ſtatues and paintings ſtill remaining moſt evidently evince were *common* to the performances of ancient artiſts; and as they poſſeſſed therefore all the requiſites to excel in portrait painting, a branch of the art at all times much in requeſt among them, there is good reaſon to infer in favour of the ancients, at leaſt an equality with the moderns in this reſpect.†

* Et noſtræ ætatis inſaniam in pictura non omittam. Nero princeps juſſerat Coloſſeum ſe pingi CXX. pedum in Linteo, incognitum ad hoc tempus. Ea pictura cum peracta eſſet in maianis hortis, accenſâ fulmine cum optimâ hortorum parte conflagravit. Libertus ejus cum daret Antii munus gladiatorium publicas porticus inveſtivit picturâ ut conſtat gladiatorum miniſtrorumque omnium veris imaginibus redditis. Plin. XXXV. 33.

† Pliny makes diſtinct mention of thoſe who were celebrated for painting *ſmall pictures*; many of whom appear to have been portrait painters. Whether theſe ſmall pictures *(tabulæ parvæ & tabulæ minores)* were of a ſize to be regarded as of the ſame claſs with the modern miniatures, I can find no ground of conjecture. Vide XXXV. 37.

The

The ſame praiſe however can hardly be afforded them as *landſcape painters*, a branch of the art adopted at a late period, and in which the ancients appear to have been ſingularly deficient. Ludius, in the time of Auguſtus, is mentioned by Pliny as the firſt profeſſed landſcape painter, and the kind of praiſe given to him, does not convey to a modern reader any very high idea of the taſte of the author, or the ſkill of the painter.*

I have before obſerved that our only knowledge of the ſtate of painting among the ancients muſt be derived from expreſſions in the works of ancient authors, or the remaining performances of ancient artiſts. Both theſe ſpecies of evidence (ſo far as I have found) are decidedly unfavourable to the pretenſions of the ancients as landſcape painters. Ludius is the only perſon whom I can find mentioned as having attended to this branch of painting: he lived in the time of Auguſtus Cæſar, when the art of painting was rather declining than advancing: we hear of no ſubſequent painter of his ſchool: the terms in which he is mentioned do not exhibit that knowledge of the ſubject which is conſpicuous in the expreſſions of Pliny, when he notices the performances of eminent painters in other ſtyles: it is

* *Non fraudando et Ludio*, &c. already quoted from Plin. XXXV. 37.

alſo expreſsly mentioned of Ludius, that he painted upon walls *(parietum picturam)* and that he ornamented them at a ſlight expence *(minimoque impendio)*. It is not thus that a modern connoiſſeur would mention the performances, of Salvator Roſa, Claude, Pouſſin, Wilſon or Loutherberg.

Nor do the remaining performances of ancient artiſts, that can in any wiſe rank under the denomination of landſcapes, convey a ſuperior idea of their ſkill. The paltry groteſque paintings of this kind that are to be found among the remains of Herculaneum, and copied in the collection of Herculanean antiquities are unworthy the loweſt claſs of modern painters; nor do the Nymphæa, or the paintings in the ſepulchre of the Naſonii (ſo far as we can decide from the copies of Lucas Holſtenius and Bellori*), much advance the reputation of the ancient artiſts. The evident want of ſkill in the grouping of the objects, in the proportion and diſpoſition of the light and ſhade, in the perſpective, in the drawing, and in every other part of theſe performances is below criticiſm.

The antique paintings yet remaining, are certainly the works of inferior artiſts;† but the ſpirit, eaſe and correctneſs of the drawing, the

* Græv. Tom. XII.

† Winckleman Hiſt de l'Art. vol. II. p. 103, &c.

force

force and propriety of the expreſſion, and in ſome caſes the praiſe due to the colouring, evince a degree of ſkill, which, in the ſuperior painters, muſt have been very conſiderable indeed, ſince we ſee it poſſeſſed in this degree, by artiſts of no eminence, and in performances executed in the very decline of the art. But of landſcape there is not one trace of the pencil remaining which ſhould lead us to infer the leaſt portion of excellence beyond what we ſee.

Of the COMIC and SATIRICAL paintings among the ancients, I can find no mention, except of one Calates, who appears to have painted comic ſubjects on miniatures, and Antiphilus a miniature painter alſo, who having caracatured ſome perſon of the name of Gryllus, theſe kind of paintings were afterward denominated Grylli.* There are no traces however of any thing among the ancients which can bear the ſlighteſt competition with the labours of an Hogarth, or even the diurnal aſſemblage of ſatirical performances which croud a modern print-ſhop.

Pyreicus ſeems to have been the Teniers of the ancients.†

Of

* Parva et Callicles fecit: item Calates comicis tabellis. ---Idem jocoſo nomine Gryllum deridiculi habitûs pinxit: unde hoc genus picturæ Grylli vocantur. Plin. XXXV. 37. Vide Pittura antice d'Ercolano, tom. III. Tavol. 26. where ſome paintings of this kind are copied.

† Namque ſubtexi par eſt minoris picturæ celebres in penecillo, e quibus fuit Pyreicus arte paucis poſtferendus:

Of the MODES of PAINTING among the ANCIENTS. The paintings of the ancient artiſts were either moveable *(tabulæ, tabulas pingere)* or upon the ceilings or compartments of buildings *(parietes, lacunaria, cameras pingere)*.

Pliny ſays that none of the artiſts were eminent except thoſe who painted moveable pictures,* but many of the great artiſts among the ancients, nevertheleſs, painted alſo upon walls, as Pamphilus, Apelles, Polygnotus, Pauſius, Onatas, &c.

The pictures *(tabulæ)* were either on fir-wood,†

propoſito, neſcio an deſtruxerit ſe; quoniam humilia quidem ſecutus, humilitatis tamen ſummam adeptus eſt gloriam. Tonſtrinas, ſutrinaſque pinxit, et aſellos et obſonia ac ſimilia: ob hoc cognominatus Rhyparographus; in iis conſummatæ voluptatis, quippè eæ pluris veniêre quam maximæ multorum. Plin. ubi ſup. The *pictura minor* here, is evidently from the context, not the *inferior ſtyle*, but the *ſmaller kind* of painting.

* Sed nulla gloria artificum eſt niſi eorum qui tabulas pinxêre, &c. XXXV. 37.

† Theophraſtus (Hiſt. Plant. lib. III. cap. 10.) ſpeaking of the fir, ſays, εξ ὧ τα των ζωγραφων πινακια ποιουσι. And in another place (lib. V. cap. 8.) he ſays of the fir, that it is proper for painters' tablets, και γαρ προς τας πινακας τὰς γραφομενας.

larch,

larch,* box-wood,† canvaſs,‡ white leather or parchment,‖ or (ſometimes) on marble.§ When they employed wood, they laid on in the firſt inſtance a white ground.¶

* Larix femina habet quam Græci vocant Ægida mellei coloris. Inventum eſt pictorum tabellis immortale nulliſque fiſſile rimis hoc lignum. Plin. XVI. 73.

† Learners began to draw upon box. Hujus (Pamphili) auctoritate effectum eſt Sicyone primum, deinde et in tota Græcia, ut Pueri ingenui ante omnia Graphicen, hoc eſt picturam in *Buxo*, docerentur; recipereturque ars ea in primum gradum liberalium.

‡ Et noſtræ Ætatis Inſaniam in picturâ non omittam. Nero princeps juſſerat coloſſeum ſe pingi CXX. pedum in *linteo*, incognitum ad hoc tempus. Plin. XXXV. 33.

Ο γραφευς σκοπον εχων, &c. ſcriptor qui hoc ſibi proponit pulchrè ſcribere, is quia charta ſæpe tenuior ſit aut fibula, aut quia atramentum minus ſit idoneum aberrat à ſcopo: ſimiliter etiam pictor ea ipſa perpetiatur, vel quia colores aut linteum (σινδων) in quo pingit minus ſit idoneum. Joannes Grammat. in Ariſt. lib. II. Nat. auſcultat. Junius, p. 170.

‖ Alia multa Graphidis veſtigia extant in tabulis ac *membranis* ejus, ex quibus, &c. Plin. XXXV. 35.

In primis quidem pictorum, et potiſſimum quando in albis *Coriis* pingunt. Galen de uſu partium hum. lib. X. cap. 3.

§ Among the antiquities of Herculaneum are four pieces on white marble. Winckleman Hiſt. de l'Art. tom. II. p. 83.

¶ Winckleman Hiſt. de l'Art. tom. II. p. 109.

Their

Their immoveable paintings upon walls, ceilings, &c. were either in freſque, or upon the dry ſtucco in diſtemper. Indeed all the ancient paintings may be reduced to, *firſt*, freſque painting *(udo illini, udo tectorio pingere)*: *ſecondly*, water colour or diſtemper painting on a dry ground (*ſicco tectorio pingere)*: and, *thirdly*, encauſtic painting *(ceris pingere—picturam inurere)*.

The ancient freſque paintings appear to have been always on a white ſtucco ground,* the colours inlaid very deep, and the drawing much more bold and free than any ſimilar performance of modern art; and indeed apparently managed in a different way. The *modern* method is, having prepared as much of the ſtucco ground as will ſerve for one day's operation, the deſign on paper is applied to the wet ſtucco, and traced with pin holes; the paper is then rubbed over with charcoal duſt, which paſſing through the pin holes, leaves the outline traced upon the *ſtuccoed wall:* this is afterwards cut in with a tool.

The outline of the ancient paintings on freſque however, were probably done at once, as appears from the depth of the inciſion, and the boldneſs and freedom of the deſign equal to the eaſe and ſpirit of a pencilled outline; and from their exhibiting no marks of the modern method of

* What the Italians now term Intonacatura.

freſque

freſque painting diſcoverable in the performances of Michael Angelo, Raphael and other later artiſts.*

Painting in freſco has a decided advantage over oil painting in the brilliancy and permanence of the colours which are not nearly ſo liable to injury from expoſure in this way as when mixt up with oil. Many of the ancient paintings laſted a very long time, and one of the earlieſt as well as fineſt among modern paintings, whereof the colours are ſtill ſaid to be very vivid, is in freſque.†

In general however, the ancients painted on a dry ground, even in their buildings, as appears from the Herculanean antiquities, whereof moſt of the paintings are thus done. At Rome and Naples the firſt (deepeſt) coat is of Terra Puzzolana‡ about one finger thick:‖ the next of ground marble or alabaſter, and ſometimes of pure lime (or ſtucco) in thickneſs about one third of the former. Upon this they appear to have laid a coat of black, and then another of

* Winckleman Hiſt. de l'Art. tom. II. p. 107. et ſeq.

† The battle of Conſtantine and Maxentius, deſigned by Raphael and painted by Julio Romano. There are about a dozen ancient freſque paintings at Rome, of which the marriage in the Aldrobandine palace is one.

‡ Of the ſame nature nearly with the *terras* now uſed in mortar required to keep out wet.

‖ Winckleman Hiſt. de l'Art. tom. II. p. 107.

red

red paint, on which laſt the ſubject itſelf was executed, as appears from thoſe performances where the figures are worn out. Such ſeems to have been their general method of painting upon *walls*, at leaſt in that period of the art, when the paintings were executed which now remain. In their moveable pictures and in the performances of their firſt artiſts, and where effect of light and ſhade was neceſſary, they doubtleſs uſed white.*

The colours employed, they ſeem to have mixed up for uſe with ſize, of which they preferred that made by boiling the ears† and genitals of bulls. This appears to have made the colours ſo durable and adheſive, that the ancient paintings lately found bear waſhing even yet with a ſoft cloth and water, and ſometimes even diluted aqua

* Anulare quod vocant candidum eſt quo muliebres picturæ illuminantur. ----- Ex omnibus coloribus cretulam (a kind of white chalk) amant adoque illini recuſant purpuriſſum, indicum, cæruleum melinum auripigmentum, appianum, ceruſſa. Plin. XXXV. 30 and 31. This paſſage implies that the colours thus enumerated were not decompoſed when uſed on *cretula* as the ground.

† Glutinum præſtantiſſimum fit ex auribus taurorum et genitalibus. Nec quidquam efficacius prodeſt ambuſtis: ſed adulteratur nihil æquè quibuſvis pellibus inveteratis, calceamentiſque etiam decoctis. Rhodiacum fideliſſimum; eoque pictores et medici utuntur. Id quoque, quo candidius eo probatius; nigrum et lignoſum damnatur. Plin. XXVIII. 71.

fortis

fortis is employed to clean the freſque paintings.* Pliny ſome where ſays that glue diſſolved in vinegar is not again ſoluble in water if left to dry, but I have loſt my reference to the paſſage.

What the *encauſtic* painting of the ancients was, has been much litigated. The Count de Caylus however, ſeems in part to have ſucceeded in explaining the paſſages relating to it, by adopting the moſt obvious meaning of them; and the paintings executed by himſelf,† Bachelier, Muntz, Zombo, &c. are no mean proofs that he was right in his conjectures.

The chief obſervations relating to encauſtic painting in the works of the ancients, are the following from Vitruvius and Pliny.

At ſiquis ſubtilior fuerit, et voluerit expolitionem miniaceam ſuum colorem retinere, cum paries expolitur et aridus fuerit, tunc ceram punicam igni liquefactam paulo oleo temperatam ſeta inducat. Deinde poſtea

* Winckleman, tom. II.

† Count Caylus exhibited a head of Minerva, painted in conformity to his theory of the encauſtic painting, at the Louvre in 1754. Bachelier, who wrote De l'Hiſtoire et du Secret de la Peinture en Cire, had executed a painting in wax in 1749. See on the ſubject of Encauſtic painting Memoires de l'Academie des Inſcriptions. XXIII. 328. XXV. 173, 187, 225. The Papers of the Abbè Mazeas, and of Dr. Parſons, in the Phil. Tranſ. XLIX. 652, 655. and LI. 40 and 53. Muntz's Treatiſe on Encauſtic Painting, and his Encauſtic Eloge of Count Caylus in Mem. de l'Acad. des Inſcrip. XXXIV.

carbonibus

carbonibus in ferreo vase compositis eam ceram apprime cum pariete calefaciendo sudare cogat, fiatque ut per æquatur. Postea cum candela linteis puris subigat uti signa marmorea nuda curantur. Hæc autem καυσις græcè dicitur. Ita obstans ceræ punicæ lorica non patitur nec lunæ splendorem nec solis radios lambendo eripere ex his politionibus colorem. Vitruvius.*

In the following passage Pliny seems to have copied Vitruvius. *Solis atque lunæ contactus inimicus. Remedium, ut parieti siccato cera punica cum oleo liquefacta, candens setis inducatur: iterumque admotis gallæ carbonibus aduratur ad sudorem usque: postea candelis subigatur, ac deinde linteis puris sicut et marmora nitescunt.*†

Ceris pingere et picturam inurere qui primus excogitaverat non constat. Quidam Aristidis Inventum putant, postea consummatam à Praxitele. Sed aliquantò vetustiores encausticæ picturæ extitêre ut Polygnoti et Nicanoris et Arcesilai Pariorum. Lysippus quoque Æginæ picturæ suæ inscripsit ενεκαυσεν, *quod profectò non feciſſet, nisi encausticâ inventâ.*‡

Pamphilus quoque Apellis præceptor non pinxisse tantum encausta, sed etiam docuisse traditur Pausian Sicyonium primum in hoc genere nobilem.‖

Encausto pingendi duo fuisse antiquitus genera constat, cerâ, et in ebore cestro, id est viriculo; donec classes pingi cœpêre. Hoc tertium adcessit resolutis in igni ceris

* Lib. VII. cap. 9.
† XXXIII. 40.
‡ XXXV. 39.
‖ XXXV. 40.

penecillo

*penecillo utendi, quæ pictum in navibus nec sole nec sale ventisque corrumpitur.**

From these extracts it appears evidently that the antient encaustic painting was of three kinds:

First, Where a picture painted in the common way, was covered with a varnish, of wax melted, diluted with a little oil, and laid on warm with a brush.†

Secondly, Where the colours themselves were mixed up with melted wax, and the mixture used while warm: and

Thirdly, Where a painting was executed on ivory by means of the *cestrum* or *viriculum*.

This last method, in my opinion, is the only one of the three which involves any difficulty in it.

The cestrum or viriculum was in all probability some sharp instrument used to trace the design on the ivory; for the penecillum was our painting-brush or pencil: but how are the words *pingere*, and *encausto* pingere, applicable to this?

Supposing Pliny himself not to be mistaken in the application of the terms he uses, the only

* XXXV. 41.

† Some of the paintings at Herculaneum are covered with a varnish which makes the paint scale off. In a room there, a table of white wax has been found, together with different colours.

By the indiscreet application of warmth to some of these paintings where the colours have been mixed with or been varnished over with wax, the design itself has disappeared: this happened to some at Resina near Herculaneum.

possible

poſſible method appears to me to be this. With the ceſtrum (or viriculum) the deſign was traced pretty deeply in the ivory itſelf, ſomething like the outline of the ancient freſque: the colours mixed up with wax, were uſed ſo warm as to permit them to enter into and fill up the ſcratches or inciſions made with the viriculum, and the ſuperfluous colour thus mixed up with wax, when cold and hard was taken off, leaving the ſurface of the painting even with that of the ivory.—This method would hardly need any ſubſequent varniſh.

Pere Harduin, Boulenger, and Durand* ſuppoſe the ceſtrum was uſed hot, and the deſign thus burnt in: but I do not ſee the neceſſity for this ſuppoſition. Dr. Parſons, thinks that as cera in the ſingular, is uſed where modelling in wax is intended, and ceræ in the plural, where encauſtic painting is ſpoken of, the latter muſt mean ſomething different from the former, and from the properties aſcribed to this method he conjectures it was *enamelling*. But I can eaſily conceive the propriety of the ſingular number in the firſt caſe, where one uniform ſubſtance was employed, and the plural in the ſecond, when there muſt of courſe have been many different preparations of wax, according to the colours mixed up with it. The method of Count Cay-

* Vid. Dr. Parſons' Paper, Phil. Tranſ. vol. XLIX. p. 655.

lus

lus is briefly this. Rub the canvaſs over with wax: then hold it near a fire that the cloth may imbibe the wax when it melts; when cool, rub it over with whitening that the water colours may adhere, and when the ſubject is painted, hold it near a fire that the colours may be imbibed.

Some experiments on this method by Mr. Colebrook may be found in Phil. Tranſ. vol. LI. and more particular directions in Muntz's Treatiſe on Encauſtic Painting.

Such appear to have been the various methods of painting among the ancients, who, though ignorant of the modern method of mixing up colours with oil, ſeem to have attained a brilliancy and a permanence of colouring unknown among the oil paintings of modern art.*

I forbear to enter at preſent into an account of the particular pigments employed by them, refer-

* La maniere de peindre pratiqué par les anciens etoit plus propre à parvenir au plus grand degré de vie et de la veritable carnation. Car outre que toutes les couleurs à l'huile perdent à la longue, céſt à dire qu'elles s'obſcurciſſent avec le temps, cette eſpece de peinture eſt toujours au deſſous de la vie. Winckleman. Hiſt. de l'Art. II. 112.

It appears from Muntz's experiments that water colours were far more bright when fixed by wax, than oil colours. On Encauſtic Painting, p. 22.

In a room at Reſina the cinnabar was ſo beautiful as to reſemble purple.

ving that for the ſubject of the ſubſequent part of this eſſay. It only remains now to notice ſome other *miſcellaneous* particulars not immediately reducible to the general diviſions already diſcuſſed.

The honourable rank aſſigned by the ancients to the art of painting, and the numerous authors among them on the ſubject, I have already noticed.

The ancients not only had *connoiſſeurs* in the art of painting among thoſe who were not painters by profeſſion, as is evident from the whole tenor of Pliny's language, in particular, as well as from the other quotations herein adduced; but they appear alſo to have been ſenſible of the value of the firſt thoughts of their eminent painters, and like us to have treaſured up *ſtudies*, the rough draughts, ſketches and unfiniſhed performances of their great artiſts. *Alia multa graphidis veſtigia* (ſays Pliny ſpeaking of Parrhaſius) *extant in tabulis et membranis ejus ex quibus proficere dicuntur Artifices.** And again, *Illud verò perquam rarum et memoriâ dignum etiam ſuprema opera artificum, imperfectas tabulas, ſicut Irin Ariſtidis, Tyndaridas, Nicomachi, Medeam Timomachi, et quam diximus venerem Apellis in majori admiratione eſſe quam perfecta, Quippe in iis lineamenta reliqua, ipſæque cogitationes artificum ſpectantur, atque in lenocinio commendationis dolor eſt manus cum id agerent extinctæ deſiderantur.*†

* XXXV. 35. † XXXV. 40.

Theſe

Theſe ſketches and outlines were executed upon dreſſed ſkins *(coriis et membranis*—probably a kind of parchment) and alſo upon wood, particularly box wood, upon which ſcholars were taught in the firſt inſtance. *Et hujus (Pamphili) auctoritate effectum eſt Sicyone primùm, deinde in totâ Græcia ut pueri ingenui ante omnia graphicen, hoc eſt picturam in buxo, docerentur; reciperetur que ars ea in primum gradum liberalium. Semper quidem honos ei fuit ut ingenui exercerent, mox ut honeſti: perpetuo interdicto ne Servitia docerentur.** Hence it appears that drawing was conſidered in Greece as an indiſpenſible part of the education of youth in every family of reſpectable ſituation. A circumſtance of itſelf ſufficient to confer a decided ſuperiority upon the country which thus encouraged it.

From hence perhaps we may alſo account for ſo many *female* artiſts being celebrated among the ancients. Pliny mentions ſeven, in his enumeration of eminent painters.† The hiſtory of the art in modern times will add but few to the names of Maria Coſway and Angelica Kauffman.

Among the modern painters of eminence, we hardly know of any except Michael Angelo who have cultivated the ſiſter arts of modelling and ſculpture. Among the ancients, it ſeems to have

* Pliny XXXV. 35. † XXXV. 40.

been common for painters to attend to theſe, and alſo for ſculptors of the firſt reputation to practiſe painting. Thus Phidias* was originally a painter: Callimachus† was a painter: Praxiteles and Lyſippus‡ are mentioned among the inventors of encauſtic painting.—All theſe were ſtatuaries of the very firſt eminence.

Euphranor modelled and made figures of porcelain; he was a ſculptor alſo on marble:‖ Protogenes caſt in braſs:§ ſo did Eutiches:¶ Polygnotus, Leſbocles, Prodorus and Pythodicus who were painters of note (particularly the firſt) did the ſame; they appear alſo to have practiſed emboſſing upon ſilver** *(cælatura.)* From this faſhionable degree of general attention, in all probability, aroſe that diffuſion, among the ancient artiſts, of eaſe and correctneſs of deſign ſo frequent in their remaining performances, and ſo

* XXXV. 34. † XXXIV. 19.

‡ XXXV. 39. It is not indeed quite certain whether theſe were the ſame perſons ſo famous as ſculptors, but from the ſimilarity of name and the commonneſs of the circumſtance, it is highly probable.

‖ Plin. XXXV. 40. § XXXIV. 19. and XXXV. 35.

¶ XXXV. 40. ** XXXIV. 19.

conſpicuous

conſpicuous in their expreſſion of the human figure in particular. *

Such are the principal facts and obſervations which I have been able to collect concerning the ſtate of painting among the ancients. I have found it impoſſible to avoid crowding the page with a multiplicity of quotations and references, conſiſtently with my deſign of collecting, in a ſmall compaſs, all the material facts upon the ſubject, and advancing none but in conjunction with the authority upon which it reſts. Perhaps the ſociety will deem the utility ſufficient to compenſate for the apparent pedantry of the method I have adopted, more eſpecially as it will render it eaſy for others to correct the miſtakes which I myſelf may have committed.

* It ſeems from the preceding references to have been common among the ancient painters to attend to each branch of the imitative arts ſo elegantly noticed in the following paſſage of Apuleius: Enim vero quod luto fictum vel ære infuſum, vel lapide inciſum, vel cerâ inuſtum, vel pigmento illitum, vel alio quopiam humano artificio adſimulatum Cadaveris ritu, unum vultum et immobilem expreſſit. Apologia.

Some ACCOUNT *of a* MINE *in which the* AERATED BARYTES *is found*; *by Mr.* JAMES WATT, *jun.*

READ NOVEMBER 30, 1789

THE late ſucceſsful and important application of the Muriated Barytes, in ſcrophylous caſes, by Dr. Crawford, having much increaſed the demand for that Salt, it is become of conſequence to humanity that the means of procuring its baſis, the Ponderous or Barytical Earth, ſhould be facilitated, and its ſcarcity diminiſhed. The method commonly employed, of obtaining it from the Vitriolated Barytes, by treating this latter with mild alkali, or charcoal, is troubleſome and expenſive, whereas the Aerated Barytes preſents us with it naturally in ſuch a ſtate, that it may immediately be uſed for ſolutions in acids, without any previous preparation whatever; it is therefore much to be deſired that the ſources from whence a plentiful ſupply of this lately diſcovered Foſſil may be obtained, ſhould be made known to the public, from whom its native places have hitherto been kept a ſecret, and ſpecimens of it been ſold rather for

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Plan of the Lead Mine
belonging to
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at Anglezark near
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Moorhouse Vein
Old Engine Shaft
Old Engine Vein
Old or Sun Vein
Old Fairfield Shaft
New Fairfield Shaft
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Chorley Brook
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for curiosity, than for use. Instigated by this motive, and at the desire of my friend Mr. Cooper, I have undertaken to lay before the Society an account of the only mine in England* in which, according to the best of my information, any Aerated Barytes has been discovered. At the same time I shall submit the few observations which two short visits have enabled me to make upon the natural history of a fossil, concerning which the curiosity of Mineralogists has been excited, but never gratified.

The first intimation of the Aerated Barytes existing naturally, was given by Dr. Withering, who published an excellent analysis of it in the Philosophical Transactions, for the year 1784, wherein he has left us little to desire respecting its chemical properties. However he was misinformed as to the place from whence his specimen came, which he supposed to be Alston Moor, where I have good authority for advancing, that none has been found. He has since informed me that he believes it came from the same mine of Anglezark, which forms the subject of the present paper.

* In Scotland it has been found in the mines of Strontain and Dunglass, near Dumbarton, but I have not heard of its being yet discovered on the Continent. A Fossil sent from Scotland to Dr. Crawford, as the Aerated Barytes, and not very dissimilar in its external appearance, seems from his experiments to contain a perfectly *New Earth*.

The Mine of Anglezark lies within a diſtrict of the ſame name, ſituated on the property of Sir Frank Standiſh, Bart. about three miles to the eaſt of Chorley, in this county. The country is hilly and of a ſtratified or ſecondary nature, conſiſting of alternate ſtrata of Sand-ſtone and Argillaceous Shiſtus, interlaid here and there with thin beds of Coal. The Valley, which is traverſed by the principal Veins, runs in an eaſterly direction; the hills on both ſides of it are low, though of ſteep aſcent. I found the Strata upon the ſouth ſide of it, in the Shaft called the New Engine Shaft, to follow one upon another in the following order and thickneſs.

½	yard looſe Stones and Sand.
7½	yards Sand-ſtone.
½	yard Argillaceous Shiſtus and Coal.
1	yard Argillaceous Shiſtus.
16	yards Sand-ſtone.
16½	yards Argillaceous Shiſtus.
42	yards whole depth of the Shaft.

In the laſt ſtratum, in another part of the mine, an Under-ground Shaft has been ſunk eleven yards deeper, in working which they cut through two or three ſmall beds, about a foot in thickneſs, of an exceeding hard bluiſh Sand-ſtone.

The Sand-ſtone which forms the ſecond and fifth ſtrata, conſiſts of ſmall angular particles of Quartz, interſperſed with others of Mica, and agglutinated by

by an argillaceous cement, so as to form a very hard aggregate of a reddish grey colour.*

The Argillaceous Shistus, which is called *Shiver* by the miners, differs little from that which is in general found incumbent upon Coal.† It appeared to contain no marine exuviæ, but abundance of thin laminæ of Martial Pyrites between its plates; at least this was the case with those pieces which were found near the vein.

The Strata dip from East to West, with a general declivity of about five inches in two yards. Those on the North side of the veins, or towards the valley, lie six yards deeper than the corresponding ones on the South.

* I have no doubt that these Strata of Sand-stone, as well as many others of the same nature, originate from Granite Mountains, which in some of the great revolutions of the globe, were in part destroyed, or wasted by the violence of the waters, forced along with the irresistible torrents, and by them conveyed to, and deposited in the beds where we now find them, where they afterwards consolidated. I am led to this conjecture, not merely from the general method of accounting for the formation of Stratified or Secondary Mountains, but more especially from having observed in these Sand-stones all the component parts of Granite, Quarz, Mica and Feltspar, the last of which in general forms the cement, though distinct crystals of it are also interspersed in the mass.

† Vide Forster's Introduction to Mineralogy, Shistus friabilis, p. 14; also Berkenhout's Natural History of Great Britain, part III. p. 14. It is omitted in Kirwan's Mineralogy, as also in Magellan's Cronstedt.

The

The Mine consists of several Veins intersecting these strata, nearly perpendicularly and running in various directions, as represented in the annexed Plan.* Most of the veins appear to have their beginning† in the Chorley Road Vein which crosses the valley at its entrance, from whence they run eastward into the slopes of the adjacent hills. The Old or Sun Vein, which is the principal one, runs for the most part in degree twenty-one of the miner's compass, which is a small deviation from due east. It is in general from six inches to three feet in thickness, and does not fall quite perpendicular, but inclines or dips a very little to the North, till it arrives at the bottom of the second stratum of sand-stone, when its inclination becomes of a sudden much more considerable, in so much that in the sixteen and a half yards to the bottom of the shaft, it is thrown five yards out of the perpendicular. The same happens to the Engine

* I received this plan as also much of my other information, from the overlooker of the mine, an intelligent miner. It is exact as far as my observation goes, at least sufficiently so, to give a general idea of the direction of the veins and their situation with regard to the adjacent valley.

† A quantity of stagnant water lying in the Chorley road vein, prevented me from examining whether these veins were continued to the west of it, but the overlooker assured me they were totally cut off by it, which is no uncommon case. Vide. *Von Oppel's Bericht von Bergbau*, § XXXVI. p. 10.

and

and Mine-houſe Veins which join it in its progreſs to the Eaſt and are nearly of the ſame thickneſs. From the Mine-houſe Vein proceeds a ſmall one called the String Vein, which runs parallel to the Sun Vein. To the North of all theſe lies the New Trial Vein, which apparently has alſo its riſe in the above-mentioned Chorley road vein and runs in the direction ſhewn in the plan, which ſeems to indicate that it likewiſe at ſome diſtance falls into the Sun Vein; it is nearly of the ſame dimenſions as the others, but has not been hitherto much worked upon, owing to its lying low, and its being difficult to carry off the water.

The Matrix of the veins is Aerated and Vitriolated Barytes. The former is found in the greateſt quantities next the ſurface, where it is almoſt entirely free from any mixture of the latter, but becomes more and more contaminated with it in proportion as the depth increaſes, until in the lowermoſt ſtrata it is ſcarcely to be met with at all, the vitriolated having uſurped its place. There is an evident tranſition from the Aerated to the Vitriolated Barytes which may diſtinctly be obſerved through its different ſtages or gradations, in all parts of the mine. Small quantities of Calcareous Spar are alſo found in the lower part of the Sun Vein.

The Ores are, the common Galena or Blue Lead Ore, plentifully attended with its uſual ſatellites, Blende or Black Jack, and Martial Pyrites.

The

The Aerated Barytes near the ſurface does not contain much Lead Ore, but when it is found in the ſecond ſtratum of Sand-ſtone, it forms the richeſt part of the mine. In the immediately following ſtratum of Shiver, it becomes more ſcarce, and indeed its preſence there is not looked upon as a good omen, as it then contains large quantities of Blende and Pyrites and but little Lead Ore. But whatever the Matrix be, it is a general obſervation that the vein is richer in paſſing through the ſtrata of Sand-ſtone, than through thoſe of Shiver.

The Ore is ſometimes found in the form of a regular vein, but more commonly in irregular nodules or cluſters, diſſeminated throughout the matrix. Where the vein is very thick, the greateſt part of it is uſually filled up with detached pieces of Sand-ſtone and Shiver, which is more particularly the caſe where one vein runs into another. In ſinking the Under-ground Shaft which I mentioned before, the quantity of ore decreaſed in proportion to the depth, until at the depth of ten yards they entirely loſt it, the vein ſtill continuing of the ſame thickneſs. The matrix was looſe vitriolated Barytes. They were endeavouring to regain the Ore and had applied a ſmall pump, worked by a water wheel in the valley above, to raiſe the water to the level, called *South Level*, which carries off all thoſe of the mine.

It appears from the beſt of my information that this Mine was firſt worked about a century ago; it

was

was then left ſtanding during a period of ſixty years until the year 1781, ſince which it has been regularly worked.*

As the greateſt quantities of the Aerated Barytes lie near the ſurface, they were probably gained during the very firſt period of working the mine, it being uſual here to take the uppermoſt part of the vein firſt, and clear all before them as they go deeper. But as that foſſil, was never ſuppoſed to be of any uſe, or to poſſeſs any intrinſic value; in all probability it has not been removed from the ſpot, and great quantities of it muſt be contained in the old heaps of ſtones and rubbiſh thrown out of the mine. Much of it may alſo be had from the old works, or what is called *the Old Man*, in the interior of the mine, having been placed there with other ſtones and wood to prevent the ſides from falling in, after the vein had been worked out. Another ſource from which it will probably ſoon be obtained in large quantities is the

* To give ſome idea of the ſmall extent of it, it will only be neceſſary to mention, that during the firſt five years of this latter period they did not raiſe above four ton of lead per annum, and that in the three laſt, they have raiſed in all only ſeventy-three ton, which difference ſeems to have been occaſioned by the driving of the South Level, at the depth of forty-two yards from the top of the New Engine Shaft, for the purpoſe of clearing the mine of its water, which before was raiſed to the ſurface with much difficulty by a water wheel. The number of Men employed now is from ten to ſixteen.

New

New Trial vein, which has hitherto been little worked upon, but where an eſſay is now intended to be made. The quantity of it gained in that part of the Sun Vein, where they are now at work is very inconſiderable.

I purpoſely avoid entering into a more minute detail of the various parts of the Mine, of the method of working the Vein, or of ſuch other circumſtances as might appear neither peculiar nor intereſting, and ſhall cloſe this account with a deſcription of the *External Characters* of the Aerated Barytes; as well for the information of mineralogiſts, who have not had an opportunity of ſeeing it under ſo many different circumſtances, as for the inſtruction of thoſe, whoſe buſineſs requires that they ſhould have a ſufficient knowledge of it, not to confound it with other foſſils.*

The

* In a late advertiſement for the ſale of the *Muriated Terra Ponderoſa*, it is aſſerted, that the mineral from which that Salt is obtained, (meaning the Aerated Barytes) frequently contains a quantity of Arſenic and Lead. If by the word "*contains*" be meant a *Chemical* combination of theſe poiſonous metals, there is not ſufficient ground for the aſſertion; ſince the Mineral, ſuch as I have deſcribed it, contains according to the beſt analyſes, nothing but Terra Ponderoſa, Fixed Air and ſometimes a ſmall adventitious quantity of Vitriolated Barytes. I have indeed obſerved that what has lain a long time in the Old Works in the interior of the mine, becomes penetrated with ochreous water, which inſinuating itſelf between the faſciculi, gives a yellowiſh tinge to the whole. The Aerated Barytes thus containing Iron, when expoſed to heat becomes green, a circumſtance which Fourcroy in a paper on that foſſil, in the fourth

The Aerated Barytes is in general of a pale greyiſh white colour, but ſometimes it inclines to the milk white, and at others has a ſlight yellowiſh tinge, which is a token of the preſence of Iron.

It is found in ſolid maſſes, ſometimes filling the whole of the vein, at others interſperſed amongſt the Vitriolated Barytes; the maſſes are generally rounded on the outſide, and affect ſomething of a globular form. It is ſeldom found externally cryſtallized: I have however obſerved four varieties of it in that ſtate. The one in which a number of ſmall Cryſtals radiated in the form of a ſtar from a centre; theſe Cryſtals were about half an inch in length, very thin, and appeared to be hexagonal columns rounded to a point. The other varieties were the ſix-ſided column, pointed

fourth volume of the *Annales de Chimie*, attributes without any ſufficient grounds, to the diſengagement of fixed air. If on the contrary, "*contains*" be intended to denote a *Mechanical* mixture, or adheſion of the Arſenic and Lead to the Aerated Barytes, I apprehend this alſo to be a miſtake, as among all the ſpecimens which I have ſeen, I have never yet been able to detect Arſenic under any form whatever. I imagine the Martial Pyrites has been miſtaken for Miſpickel; but the Arſenical part of Miſpickel not being ſoluble in the marine acid, can be of no prejudice in preparing the Muriated Salt, and it is hardly poſſible to confound either it, or Blue Lead Ore with Aerated Barytes.

I have thought it neceſſary to make the above remarks, that the idea of ſo ſimple a medicine being liable to contain ſuch poiſonous metals, might not render medical men unneceſſarily ſcrupulous in preſcribing, or deter patients from taking it.

with

with a pyramid of the ſame number of faces; alſo the double ſix-ſided, and the double four-ſided pyramid.

It has a ſtrong Gloſs or Luſtre upon the recent fracture.

Its Fracture, in one direction, is ſtriated or radiated, compoſed of ſmall convergent faſciculi; when broken tranſverſely it aſſumes a kind of glaſſy or chonchoidal fracture, like Quartz. When externally cryſtallized, its Fracture does not appear radiated in any ſenſe.

It ſplits into irregular, rather longiſh Fragments.

The large maſſes are frequently compoſed of globular concentrical pieces, ſeveral of them lying one on the outſide of another, and having a roundiſh one in the centre, to which the radii or faſciculi of the reſt are pointed.

It is ſemi-tranſparent, or diaphanous; juſt ſoft enough to admit of being ſcraped by a knife. Is brittle, and heavy, but in a ſomewhat leſs degree than the Vitriolated Barytes. Its ſpecific gravity has been found to be from 4.300. to 4.338.

Perhaps to ſome, after the cenſure which that excellent chemiſt Mr. Kirwan has lately paſſed on the utility of external deſcriptions of foſſils, this delineation of thoſe characters, by which, without having recourſe to the more tedious chemical ones, the Aerated Barytes can invariably be diſtinguiſhed from all other foſſils, may appear ſuperfluous. But many eminent mineralogiſts ſtill differ in opinion

nion from that gentleman, both with regard to the sufficiency, certainty and utility of these characters; and I hope soon to see the grounds of their dissent clearly stated and sufficiently established.

However before such descriptions can be carried to that degree of perfection, to which the acute observations and accurate distinctions of a *Werner*, have raised them amongst the Germans, it will be necessary both to adopt new words into our language, and to fix more precisely and mineralogically the meaning of those we have already.

On the Effects *produced by* different Combinations *of the* Terra Ponderosa *given to Animals; by Mr.* James Watt, *jun.*

read november 13, 1789.

At the Time of writing the foregoing Paper, I consulted Dr. Leigh's *Natural History of Lancashire, Cheshire, &c.* in hopes of meeting with something illustrative of the Antiquity of the Mine of Anglezark, and, though deceived in my expectations in that respect, I was much struck with a curious passage, which seemed to point out some remarkable properties of the Aerated Barytes unnoticed by later Writers. It is as follows.

" There are different kinds of Spars; as to " their internal qualities, some, if taken inwardly, " will vomit and purge most violently, as that " in the Lead Mines near Andlesack, in Lanca- " shire; and this no doubt consists in great " measure of Salt and Sulphur, which I take to " be the reason that it is emetic. But the na- " ture of this Spar will more fully be made out " from the subsequent instances, and the first is " by calcination, in which you easily discover " that a pound of this will yield a drachm of *Arsenic* " at the least, lying between the lamellæ of the " Spar. Whence therefore this comes to be of so " poisonous a nature is plainly evident; notwith- " standing this, the neighbours thereabout will " frequently take a scruple at least of this in fits of " the *stone*, in whom it vomits, purges and works " violently by Urine; in this case as they have " frequently assured me they have found great " relief; whence the vomiting and purging " proceed is evident as we have before observed, " viz. from the Arsenical Sulphur; as likewise " from that profuse quantity of Urine, which " may sufficiently hint to us what kind of mor- " bific matter it is that causes the Diabetes, " both in the quickness of its poisonous quality, " and likewise the sweetness of the Urine. " There are some who have ventured to be so " daring as to take a drachm of this, particularly " one James Barns's wife and child, but, alas! to

" their

"their woful experience they found the sad "effects of it, for in about nine hours afterwards "they both expired. The like quantity of this "in about three hours time will kill a dog; "and it is observable that the dog while living "is deeply lethargic, which may farther illus- "trate to us, in malignant *Fevers* attended with "those Symptoms, what kind of matter proba- "bly it is that causes those Symptoms; but that "is more fully discussed in its proper place. "Nay so spreading is the poison of this Spar, "that it has not only been fatal to the creature "that has taken it, but a dog, by licking the "blood of a Swine which had taken it acciden- "tally mixed with meal and butter, expired "likewise; and it is farther observable, that "the flesh of the Swine was afterwards eaten, "and did no mischief though the blood was "poisonous; because, as we may reasonably "conjecture, the Arsenic had not spread itself "farther than the mass of the blood."*

Upon reading this passage, I recollected having been told, by the Miners at Anglezark, that they used the Aerated Barytes in the neighbourhood to destroy Rats, I therefore had little doubt that this must be the Spar above alluded to. And though some of its effects appeared to be exaggerated and the method of accounting for

* Page 76.

them erroneous, yet the subject seemed well worthy of a nearer investigation. For as Poisons, when properly administered, are generally esteemed the most efficacious remedies, and as combinations of the Terra Ponderosa had already been exhibited, it appeared desirable to trace, upon inferior animals, the effects of a substance which promised to be of importance to the health of mankind; at any rate, it was adding one fact more to our knowledge, to become thus acquainted with its pernicious effects. To this purpose I instituted the following experiments.

Experiment I. At four o'clock in the afternoon I gave a Terrier bitch, weighing about thirteen pounds, which had been without food that day, one drachm of Aerated Barytes, finely pounded and strewed upon some broiled beef, to induce her to take it. The first half hour it did not appear to produce any effect. At five o'clock she began to froth at the mouth and to be slightly convulsed; she drank a little water, but appeared very lethargic. Between five and six o'clock she was violently purged, and vomited a quantity of whitish curdled matter, after which she became extremely weak and languid; she still continued to froth at the mouth, and refused water, though without any signs of aversion. From six to seven o'clock, her debility kept gradually increasing, until a complete Paralysis took place: she lay extended, entirely deprived of the command of her

her limbs and even incapable of removing her head from one position to another, so absolutely was all muscular power relaxed, that upon taking hold of the loose skin of her neck and afterwards relinquishing the grasp, it retained the position into which it had been forced; her eyes however were still moveable, her breathing was tolerably easy, and she did not give any signs of acute pain. From seven to eight o'clock, the same Symptoms continued, without any other alteration than that of her breath becoming more short and convulsive. The convulsions became stronger between eight and nine, and she gave evident tokens of pain. At half past nine o'clock the Convulsions and Symptoms of pain had almost ceased, and the lethargic stupor was considerably increased. At ten o'clock I left her, her eyes were then sunk and half closed, she was totally deprived of sensation and of motion, except that excited by her fetching breath, so that her approaching dissolution appeared evident. The next morning she was found dead.

On Dissection, both the Ventricles and Auricles of the heart were found filled and distended with black grumous blood; the stomach empty, but apparently much inflamed; the bladder empty and perfectly collapsed; the other intestines in their usual state, and the brain also perfectly sound.

Exp. II. At fifteen minutes after twelve, I gave a Puppy, weighing nine pounds, forty grains

of finely pounded Aerated Barytes strewed upon bacon. During the first half hour no visible effects were produced, but a few minutes afterwards an incipient languor was distinctly observable, yet accompanied with a degree of restlessness and seeming anxiety, which continued till about two o'clock, when he vomited the whole of what had been given him, and was violently purged. From that time till six o'clock he appeared extremely anxious and restless, without giving any symptoms of acute pain and without becoming at all paralytic. He was found dead early the next morning. Upon opening the carcase, the Stomach was found replete and distended with a large quantity of Straw, which the animal had probably eaten to relieve the uneasiness he felt. The other appearances were quite natural, except that one lobe of the lungs was a little inflamed, which might be adventitious.

Mr. Thomas Henry, junior, repeated the first experiment and found similar effects produced; the Stomach and the whole intestinal canal were much inflamed in his subject; the inner coat of the Stomach, particularly about the pylorus, was of a deep livid colour.

These experiments having appeared sufficient to prove the strong operation of the Aerated Barytes on the Animal Œconomy, I was desirous of knowing the relative effects produced by those combinations of the Terra Ponderosa which had already

already been exhibited, and with this view instituted the following experiments.

Exp. III. I gave a Dog weighing twenty pounds, thirty grains of crystallized Muriated Barytes, with bacon. He appeared very uneasy immediately after taking it, and, though before extremely hungry, refused meat. In about twenty minutes, he began to froth at the mouth, and in ten more he vomited a little, after which he drank freely of water; he was purged and remained extremely sick and uneasy till about an hour after he had taken it, when he threw up the whole, but did not get the better of his sickness and uneasiness, for near twelve hours afterwards.

Exp. IV. After an intermission of a week, I gave the same dog one drachm of the crystallized Muriated Barytes as above; he grew sick in a quarter of an hour and threw up the whole in twenty minutes, after which he was violently purged. He continued ill for about four hours, when he again recovered his appetite and the next day was perfectly well.

Exp. V. I administered fifteeen grains of the crystallized Nitrated Barytes to a Puppy weighing nine pounds. It did not bring on any sickness till about forty minutes after he had taken it, and he retained his appetite till then. In five minutes more it acted emetically and cathartically, after which he gradually recovered his vivacity, and was well in an hour's time.

Exp. VI. I attempted to give the same dog thirty grains of the Nitrated Salt, with some meat, but he refused to take it. I then dissolved that quantity in water and poured it down his throat, though not without spilling some of it. It produced an immediate frothing at the mouth, which was quickly followed by vomiting and sickness. However, he recovered in the course of three or four hours, and eat with great voracity.

An indispensible attention to business prevented my prosecuting these experiments any farther; they must therefore remain for those who have more time and leisure to bestow upon them should they be deemed worthy of a continuation. However, before I relinquished the subject I was desirous of knowing what effect would be produced by the simple Ponderous Earth. I still was of opinion, notwithstanding Dr. Withering's and Dr. Priestley's experiments, that the fixed air might be expelled from the Aerated Barytes by a strong heat alone, and sent some of it to Mr. Josiah Wedgewood, junior, requesting him to expose it to the greatest possible heat in one of his father's furnaces; he was so obliging as to comply and favoured me soon after with the following Account of his experiment.

"I have exposed to a very strong heat for "thirty-six hours, two ounces of the Aerated "Barytes, but have not been able to weigh it "since, from an effect having taken place which "I did

"I did not expect. Some part of the Barytes "appears to have begun to vitrify with the "matter of the cup in which it was exposed and "has formed a greenish substance, which sticks "pretty fast to the Vessel and in one place has "corroded it so much as to have formed a small "hole exactly in the way that Fluor does. As "I was not very careful in picking the pieces "I suppose the greenish colour to have been "owing to some impurities.* This experiment "has however proved that a long continued heat "does not expel the whole of the fixed air if it "does any part of it, for the burnt Barytes "immediately upon coming out of the oven "effervesced strongly with the Marine Acid and "dissolved exactly in the same manner as the "crude. The heat it has undergone was 110°. "of my Father's Thermometer."

Finding it was impossible to render the earth caustic by this process, I desired the above-mentioned Gentleman to make use of Dr. Withering's method of dissolving it in the Marine Acid, precipitating by a mild Alkali, and expelling the fixed air by heat from the artificial Aerated Barytes thus formed. This was done and the earth rendered perfectly caustic,

* The Specimens I sent Mr. Wedgewood were penetrated with ochreous water, therefore I should imagine the green colour to proceed from the Iron.

but

but before I received it, which was a couple of days, it had attracted so much fixed air from the Atmosphere as to be become perfectly mild, and it required a strong heat to render it again caustic.

Exp. VI. One drachm of this given to a Dog weighing about sixteen pounds, brought on a vomiting and purging in about a couple of hours, after which he was a little sick, but soon recovered and has been well ever since.

By these experiments, Dr. Leigh's Account of the general fact of the pernicious effects of Aerated Barytes is sufficiently proved; and it appears, that the Muriated and Nitrated Barytes may be given, to dogs, without any permanent injury, in much greater quantities than has been supposed. It also appears, that the Caustic Earth does not, by any means, produce such noxious effects as the Aerated; owing, perhaps, to the great quantity of fixed air which becomes disengaged, when the latter is dissolved in the Stomach by the gastric acid. How far the inference, from inferior animals, will hold with regard to mankind, must be left to better Physiologists to determine.

AN

APPENDIX

TO THE

INQUIRY CONCERNING THE

PRINCIPLES OF TAXATION;

CONSISTING OF SUPPLEMENTARY

NOTES AND ILLUSTRATIONS.

ADVERTISEMENT.

IN the following Notes the Author has not deemed it neceſſary to confine himſelf ſtrictly to the ſubject of Taxation; but has touched upon various other topics, relative to political œconomy, and to the foundation of civil government. As theſe are intimately connected with, and illuſtrate each other, he truſts the reader will excuſe the latitude he has taken, in this Appendix; which is inſerted at the end of the preſent volume, rather than at the cloſe of his Diſſertation, on account of the length to which it has been extended.

APRIL 1, 1789.

AN APPENDIX

TO THE INQUIRY CONCERNING THE

PRINCIPLES OF TAXATION,

CONTAINING SUPPLEMENTARY

NOTES AND ILLUSTRATIONS.

Note (A) page 5.

PROPERTY NOT THE MERE CREATURE OF CIVIL SOCIETY.

A LEARNED friend, of diſtinguiſhed rank both in the church and in the republic of letters, to whom I communicated the Inquiry concerning the Principles of Taxation, "regards property "as very much the creature of civil ſociety, and the ſupreme "magiſtrate as authorized to apply the whole of the property of "every individual, to the uſe of the whole community."*

Notwithſtanding the deference and reſpect I feel for the deciſion of one, whom I know to be a very able judge of the ſubject of legiſlation; yet I am ſtrongly inclined to controvert the doctrine advanced, which by *leaving nothing that a man may call his own*, (to adopt the expreſſion of Lord Clarendon), ſeems to ſubvert the intereſt we have in Society itſelf.

I. A deſire of poſſeſſion, and tenaciouſneſs of what is attained are manifeſted in the earlieſt ſtages of life. They are modifications of one and the ſame principle, which grows with our growth, is independent of ſociety, and ſubſiſts in as full force among ſavages as in the moſt cultivated nations. The like principle is common even to the brutes. The beaſt of prey

* A ſimilar opinion is advanced by Puffendorf.

aſſerts

aſſerts an excluſive right to his den, and to the proviſions he has ſtored for himſelf, or for his offspring. The cock drives every invader from his dunghil. And the rooks puniſh with ſeverity the marauders, that come to pilfer their neſts. But to enter into a diſcuſſion of the origin of property would exceed the limits of a note. Suffice it to obſerve, that we can clearly deduce it from the neceſſities, the deſires, the affections, and other active energies of man. Of theſe energies, civil ſociety is the *conſequence* and not the *cauſe*; and its office is to regulate them, to augment their vigour, and to afford more complete ſecurity in whatever is acquired by them. If, therefore, the powers of his nature be man's excluſive right, every thing reſulting from them muſt be equally appropriate. And the juſt claim of government extends only to an equivalent to the benefits enjoyed under it.

II. Juſtice, fidelity, and veracity imply, in their exerciſe, the ſocial ſtate: But their obligation is independent of, and preſuppoſed by the political union; and conſtitutes its only rational and legitimate bond. Is property, more than thoſe moral virtues, the creature of civil ſociety? All of them may ſubſiſt without government: For if only two men dwelt together on a deſart iſland in a ſtate of perfect equality, each would have his appropriate rights of poſſeſſion; and the claim to juſtice, fidelity, and veracity would be reciprocal.

III. The ſocial union is a combination of numbers, for mutual aſſiſtance, comfort, improvement, and protection. If every individual concur in the public acts of ſuch a community, at the firſt view, there might ſeem to be no violation of private rights. It ſhould be remembered, however, that the circumſtances and opinions of thoſe individuals may vary in the lapſe of time; and that the rights of poſterity, alſo, are involved in their deciſions. The preſent inhabitants of Denmark are now enſlaved by the raſh ſurrender of their liberties, which was made in 1660. Beſides, the public acts of a community, if large, muſt neceſſarily be acts only of the majority: And a majority may, indeed frequently does, as the hiſtory of all nations evinces, commit violence on the rights of the minority.

Fanaticiſm

Fanaticiſm, like that which ſubſiſted amongſt the anabaptiſts of Munſter, about two centuries ago, may induce the civil magiſtrate to order every man to bring forth his gold, ſilver, and precious effects, to be depoſited in a public treaſury, and to be diſpenſed, for common uſe. But this would be an act of power, not of juſtice or legitimate authority.

IV. Grants of money, in almoſt every country, are made on expreſs conditions, and as voluntary ſacrifices of private rights to public good.

* Whenever the public good requires the involuntary ſacrifice of the good of an individual, great attention is paid, in all juſt and moderate governments, to do as little violence as poſſible; and to make full recompenſe for the injury ſuſtained. This ſeems to be an unequivocal acknowledgment of the exiſtence of private property, in the ſtricteſt ſenſe of the word.

V. As every man has a natural right to life, he muſt have the ſame natural right to the means of ſupporting life. On this principle, the Athenians ſeem to have conſidered that ſhare of a man's property, which is neceſſary to his ſubſiſtence, as abſolutely exempt from taxation. Thus a rent of five hundred meaſures of corn was aſſeſſed in the yearly contribution of a talent. A rent of three hundred paid half a talent. A rent of two hundred paid one ſixth of a talent; and land of a lower produce paid no ſubſidies at all. In the early days of Rome, ſeven acres were the utmoſt extent of landed property, which a Roman citizen was allowed to hold. This portion was, probably, not more than adequate to the ſupply of a family.

VI. There is a ſpecies of acknowledged property appertaining to ſtates, over which they exerciſe an excluſive power of diſpoſal, which bears a cloſe analogy to private poſſeſſions. It conſiſts in crown-lands, public buildings, highways, fortifications, &c. Can public levies, to a conſiderable extent be, like this, regarded as the abſolute right of the civil magiſtrate?

VII. But it may be urged, that the greateſt part of property, whether perſonal or real, is enjoyed by *inheritance* under the

* *Dominium eminens:* Tranſcendental property.

authority

authority of *laws*; and that the laws, being the creatures of civil society, render property itself equally so. The argument, however is a fallacy. Law does not constitute the right to property; but only recognizes, sanctions, and regulates the exercise of it. What a man has acquired by art or industry, without violation done to others, is at his absolute disposal; and may, if not applied to his own use, be given to his children, his relations, or friends. Nor can there be any definite time for the restriction of such transfer; and consequently it will have equal validity at the hour of death as in the prime of life, provided the donation be voluntary, and made with a sound mind. It has indeed been said, that in a state of nature, a man's right to a particular spot of ground arises from his using and wanting it, and consequently ceases with the use and want; so that at his death the estate reverts to the community, without any regard to the last owner's will.* But this presupposes what is in itself a contradiction, that man in *community* is a *solitary* animal, labouring, and living only for himself: Whereas the truth is that he labours and lives more for his family and his dependants, than for himself; that his attachments to them stimulate his faculties and give energy to his exertions; and that to deprive him of the future end, he seeks in his acquisitions, is the same wrong in kind, and much greater in degree, because more injurious to his best and strongest feelings, that it would be to deprive him of the present use of them. A father may leave an infirm widow, and numerous helpless orphans; for whom he anxiously toiled, and toiled with success. Is it equitable that they should be cast on the public for support? If it be not, the law, which guarantees to them their father's possessions, only confirms, and does not institute their right, which is founded in nature, reason, and justice.

VIII. The dispute, perhaps, about the right of the supreme magistrate to the entire property of the whole community, is rather verbal than substantial. For, admitting it to subsist, it can only be exercised when rights of the whole community, still dearer than those of property, are in the most imminent hazard, such as life, liberty, and religion. There must then be a justify-

* Paley's Moral Philosophy, vol. I. p. 222, 8vo.

ing

ing plea for ſuch exerciſe of power: And the ultimate deciſion, concerning this juſtifying plea, muſt reſt with the people.

Note (B) page 12.

INFLUENCE OF THE CROWN.

The reſolution, that "the influence of the crown hath increaſed, is increaſing, and ought to be diminiſhed," was moved by Mr. Dunning; who explained his meaning to be, not the influence of the virtues of the ſovereign, or the juſt rights of his prerogative, but that which aroſe from corruption, and other undue practices.

Sir Fletcher Norton, the Speaker of the Houſe, obſerved, "that it would be criminal in him to remain ſilent on this occaſion. He declared, in the moſt direct terms, that the influence of the crown had been increaſing of late to an alarming degree. No man had a higher veneration for monarchy than he had: He meant that ſpecies of it eſtabliſhed in this country; a monarchy limited by law. Such a government required no aſſiſtance, but what was derived from the conſtitution and the laws. The powers, veſted in the executive part of government, were ample and ſufficient for all the purpoſes of good government; and, without any farther aid, much too ample for the purpoſes of bad government. And he thought himſelf bound, as an honeſt man, to ſay, that the influence of the crown had increaſed much beyond the ideas of a monarchy ſtrictly limited in its nature and extent." See New Annual Regiſter, 1780, p. 148.

Sir William Blackſtone, ſpeaking of the ancient prerogatives of the crown, and of the bounds ſet to them, at the revolution, ſays "though theſe proviſions have, in appearance and nominally, reduced the ſtrength of the executive power to a much lower ebb than in the preceding period; if, on the other hand, we throw into the oppoſite ſcale (what perhaps the immoderate

" reduction of the ancient prerogative may have rendered, in " ſome degree, neceſſary) the vaſt acquiſition of force, ariſing " from the riot act, and the annual expence of a ſtanding " army; and the vaſt acquiſition of perſonal attachment, ariſing " from the magnitude of the national debt, (now, 1788, augmented one hundred millions) and the manner of levying thoſe " yearly millions that are appropriated to pay the intereſt; we " ſhall find that the crown has, gradually and imperc ptibly, " gained almoſt as much in influence, as it has apparently loſt " in prerogative." Commentaries, B. IV. ch. 33.

Mr. Hume obſerves, that, " on a moderate computation, " there are near three millions a year at the diſpoſal of the " crown. The civil liſt amounts to near a million; the collec- " tion of the taxes to another; and the employments in the army " and the navy, together with eccleſiaſtical preferments, to above " a third million: An enormous ſum, and what may fairly be " computed to be more than a thirtieth part of the whole income, " and labour of the kingdom." Eſſay VII. vol. I. p. 49, 8vo. edit. But Mr. Hume's remarks were firſt publiſhed in 1742; ſince which period, the national debt has been more than doubled. The army has been increaſed, and eccleſiaſtical preferments have been conſiderably augmented in value. An immenſe patronage has alſo been eſtabliſhed in the Eaſt-Indies. That of America has indeed been loſt; but, in a comparative view, it was of ſmall eſtimation.

The influence of the crown may be conſidered in two points of view; firſt, as it reſpects the exerciſe of the royal prerogative; ſecondly, as it affects the freedom and independence of parliament. In the firſt, we muſt regard the exerciſe of every branch of the royal prerogative, as no other than *a diſcretionary power to do good*; and conſequently that every appointment to civil or military offices, except of perſons known or believed to be beſt qualified for their execution; every diſtinction of rank conferred on thoſe who are not of adequate deſert; and every reward given, but for real ſervices to the ſtate, is a violation of a truſt repoſed in the ſupreme magiſtrate. In the ſecond point of view, we are to conſider each individual, compoſing the two branches of the legiſlature,

legiſlature, as under a ſacred obligation, to weigh, attentively, all queſtions, that relate to the public intereſt; and to vote upon them agreeably to his honeſt and ſerious conviction. If he deviate from this rule, he betrays his truſt, and forfeits the character of patriotiſm, probity, and honour: And if the CROWN have ſeduced him, by office, titles, or pecuniary reward, the double guilt is incurred of violating its own duty, and of inciting another to a correſpondent violation.

What then is juſt and honourable influence? In the ſovereign, it is to ſtimulate to exertion, and to excite ſteadineſs in duty, by well-grounded reſpect, gratitude, and attachment. In the ſubject, it is to feel theſe principles in all their force, but with a proper attention to their true object; to diſcriminate between the perſonal and official capacity of the ſupreme magiſtrate; and whenever a competition ſubſiſts between their reſpective intereſts, to regard himſelf as the beneficiary of the public, and as thus bound, by an additional obligation, to fulfil the duties of his ſtation, either as a military commander, a magiſtrate, or a legiſlator. This diſtinction the emperor Trajan nobly maintained, on the appointment of Suberanus, to be captain of the prætorian guard. Preſenting him with a ſword as the badge of his fealty, he ſaid, "Let this be drawn in my defence, if I rule according to equity; but if otherwiſe, it may be employed againſt me."* With the ſame magnanimity he would have addreſſed a præfect of the treaſury, or of the city. "I have inveſted you with a "poſt of high dignity, authority, and emolument, becauſe I have "confidence in your talents and your virtues. Manifeſt your "ſenſe of the favour, by your zeal in my ſervice; always re-"membering however that my ſervice implies only that of the "commonwealth." Prince Kaunitz, the miniſter of the imperial court of Vienna, is applauded by Mr. Necker, for his impartiality, integrity, and dignity of character, in the choice of perſons to fill up the great offices of ſtate. He relates, that having perſuaded the empreſs Maria Thereſa, to beſtow the conduct of the war department on a general of great ability, but

* Plinii Epiſtolæ.

whom he had just reason, as an individual, to dislike; the commander, affected by so generous an action, earnestly wished for a reconciliation. Prince Kaunitz, however, declined all his advances; observing that he had only done his duty, in causing his sovereign to pay due regard to merit; but that in the direction of his private intimacies or connections, he was subject to no controul, and might, in perfect consistence with duty, indulge an entire freedom of choice. This fact well illustrates the true application and extent of influence.

Note (C) p. 17.

DOCTRINE OF PASSIVE OBEDIENCE.

Mr. Hume has very facetiously imputed *Toryism* to SOCRATES; because, by declining to make his escape out of prison, he sanctions the doctrine of passive obedience and non-resistance. But the truth is, this venerable philosopher disdained to save the short remnant of his days by an ignominious flight; by practising the arts of corruption; or, by involving the ministers of justice in the guilt of betraying their trust. He does not appear to have treated the tumultuous assembly, which sat in judgment upon him, with *passive* deference. "Be not offended Athenians;" he said, "it is "impossible, that any one should long preserve his life, who ar- "raigns, with intrepidity, your licentiousness and injustice!"

In the admirable arguments for submission to the laws, which Plato has put into the mouth of his master, in the dialogue entitled CRITO, the obligation of the *social compact* appears to be expressly and forcibly pleaded. Very able writers have contended for and against this alledged foundation and bond of civil society. It has been condemned, as built on the chimerical supposition, that "savages have been called out of caves and deserts, to deliberate "and vote upon topics, which the experience, the studies, and "the

" the refinements of civil life alone ſuggeſt."* But the ſuppoſition involves in it no ſuch abſurdity. Savages could never aſſemble together or live in community, without ſome common principles of harmony and agreement. And each individual feeling their influence and yielding to their authority, a ſocial compact was thus eſtabliſhed without deliberation or formal deſign, by laws which reſult from the original conſtitution of human nature. The veneration of age; reſpect for ſuperior talents or virtues; a ſenſe of juſtice, of veracity, and honour; a regard to common intereſt; the defence againſt, or invaſion of common enemies ſubſtantiated theſe laws. They were voluntarily acquieſced in by all; they became confirmed by time; improved by experience; and enlarged by the progreſſive advancement of ſociety.

It is ſaid, that " if by virtue of a compact, the ſubject owes " obedience to government, he ought to abide by the form of " government which he finds eſtabliſhed, be it ever ſo abſurd or " inconvenient. He is bound by his bargain."† This objection will appear to have no validity, when it is recollected that it is not an ordinary bargain or contract, in which two parties are ſuppoſed, of oppoſite intereſts; but an union or partnerſhip, in which all are equally concerned, though with various truſts and deſignations. To the firſt and neceſſary laws of this union, which conſtitute the eſſence of government, ſubmiſſion is abſolutely due. Governors, who are the organs of adminiſtration, are equally ſubject to them with the governed. And as theſe governors repreſent the majeſty and authority of the whole, it is evident that the whole, or a majority of the whole (which can alone act) are ſuperior to their repreſentatives; and may enlarge, circumſcribe, or new-model the authority which they delegate, as they ſhall deem moſt expedient. The public good however requires that government ſhould poſſeſs ſtability, becauſe revolutions are uſually attended with much preſent ſuffering and evil. Civil magiſtrates, therefore, are inveſted with powers and prerogatives adequate to

* See Paley's Principles of Moral and Political Philoſophy, book VI. ch. 3, p. 416. 4to.

† Idem. p. 421.

extraordinary emergencies: And the policy of this is ſo clear and rational, as to command general acquieſcence, or implied conſent.

It is further alledged that "if every man has a right to ſurrender "his independance on bargain, (whether expreſs or implied) he "muſt have an equal right to retain it."* This is a fallacy: For as man is by nature a ſocial being, ſociety is eſſential to his improvement and happineſs. But ſociety cannot ſubſiſt without civil polity; that is, without ſuch laws and regulations, as are neceſſary to guard againſt imperfection and depravity. And man being alſo rational as well as ſocial, he is bound not to withhold his conſent from what is conducive to his intereſt and felicity.

Government is aſſerted to have been "at firſt, either patri-"archal or military; that of a parent over his family, or of a "commander over his army."† When the offspring of the patriarchs had attained the age of diſcretion, and the capacity of judging and acting for themſelves, it is evident that their ſubmiſſion to paternal authority muſt have been voluntary; and it could only be voluntary, on terms of reciprocal benefit and comfort. Such terms though not expreſſed, muſt be underſtood; and conſent, on implied terms, is in its nature a tacit compact. When two or more patriarchal families united together, the compact was, probably, expreſs and not implied.

If government was at firſt military, this preſuppoſes compact: For no individual could have ſufficient force to compel numbers to ſubmit to his authority, and combine for its extenſion. Their union with him, and ſubjection to him, muſt have been by choice and agreement. A civil polity was, therefore, conſtituted antecedent to conqueſt; and I preſume, conqueſt will not be deemed a legitimate foundation of any government.

* Diſquiſition on Government and Civil Liberty, by Soame Jenyns, Eſq. A very excellent anſwer, to this Diſquiſition, appeared in 1782; printed for Debrett, in Piccadilly.

† Paley's Moral Philoſophy, p. 399.

Every

Every juſt government ſeems to include, in its conſtitution, the three following acts of the community. I. A compact to unite together, to be governed in their common intereſts, by common laws. II. An agreement reſpecting the perſons to be intruſted with the framing and the adminiſtration of the laws. III. A reciprocal agreement between the governors, thus conſtituted, and the governed.* At the glorious revolution in 1688, theſe ſeveral acts may juſtly be ſaid to have taken place. For the prince of Orange, in his declaration, invites and requires all the peers of the realm; all gentlemen, citizens, and other commons, of all ranks, to come and aſſiſt him in the execution of his deſign, to re-eſtabliſh the conſtitution of the Engliſh government. The convention, which aſſembled on this ever memorable occaſion, depoſed the ſupreme magiſtrate, *expreſsly* becauſe he had broken the *original contract*; and appointed another on certain ſtipulated terms, declarative of the reciprocal duties of king and people; and reducing the contract, as Sir William Blackſtone obſerves, before built on theory and natural law, to a plain certainty. The ſame learned Judge remarks, that the original contract is now comprehended in the coronation oath, and in that of allegiance.†

When Maria Thereſa aſcended the throne of Hungary, in 1740, ſhe took the ancient oath as follows. "If I, or any of "my ſucceſſors, ſhall at any time infringe upon your privileges; "*by virtue of this promiſe*, you and your deſcendants ſhall be "allowed to defend yourſelves, and ſhall not be treated as re-"bels." It ſhould ſeem that the two laſt kings of Pruſſia regarded the privileges of their ſubjects as conferred, not confirmed, by

* Conſult Hucheſon's Syſtem of Moral Philoſophy, vol. II. p. 227.

† See Blackſtone's Commentaries, book I. p. 233.

N. B. Theſe notes and illuſtrations were written before the revolution in France, an event which confirms many of the principles that have been advanced. The Count Boulainvilliers, who ridicules the notion of an ORIGINAL CONTRACT, although himſelf a republican, had he lived at this period, would have ſeen the doctrine eſtabliſhed in his own country, as well as in that of America.

virtue of the coronation oath; and therefore they declined the ceremony of a coronation; probably becauſe, according to uſage, it would have obliged them to an explicit declaration of the duties owing to their ſubjects. Baron Bielfield, in one of his letters, thus expreſſes himſelf. "Frederic I. of Pruſſia, had "good reaſons for *ſubmitting* to that ceremony; but his ſuc- "ceſſors receive the crown from the hands of Providence, and "not from their ſubjects. They content themſelves with admi- "niſtering the oath of fidelity to the troops, to the nobility, and "to the people." *

Mr. Hume argues againſt the original contract with much acuteneſs: yet he candidly acknowledges, that the conſent of the people, where it has place, is the *beſt and moſt ſacred foundation of government*. But the converſe to the beſt and moſt ſacred can never be, in any degree, good or ſacred. If full conſent render government moſt legitimate, the entire want of it, or abſolute force, muſt conſtitute the moſt unjuſt tyranny. A ſcale may thus be formed between theſe extremes, by which the degree of legitimacy in every civil eſtabliſhment may be eſtimated.

In the Eſſay on Taxation, I have adopted the expreſſion SOCIAL UNION, as more comprehenſive than any other, becauſe it involves in it all the *rights* and *duties*, that reciprocally belong to the individuals of which it is compoſed. The obligation to it is antecedent to compact, conſent, or expediency. It is the ordinance of God, manifeſted in the conſtitution of our nature. For no man has the moral, though he may have the phyſical power, to withdraw himſelf entirely from the intercourſe of his fellow creatures; as it would be, in a great degree, the extinction of being, ſo far as relates to virtue and intellectual improvement, which are the chief objects of it. Civil polity is a conſequence of the ſocial union, the mode of which is regulated by temporary expediency, and confirmed by compact, or conſent. But no original compact, or conſent can give permanent validity, to what is inconſiſtent with the fundamental principles of the SOCIAL UNION. *Salus populi ſuprema lex.*

* See Towers's Life of the King of Pruſſia, vol. I. pp. 82, 115.

Note

Note (D) p. 18.

THE DOCTRINE OF NON-RESISTANCE MERELY SPECULATIVE.

In the year 1610, James I. thus expreſſes himſelf, in his ſpeech to both houſes of parliament. "As it is atheiſm "and blaſphemy, in a creature, to diſpute what the Deity "may do; ſo it is preſumption and ſedition, in a ſubject, "to diſpute what a king may do, in the height of his power. "Good chriſtians," he adds, "will be content with God's will "revealed in his word; and good ſubjects will reſt in the king's "will, revealed in his law."* The king's ſpeech is now always ſuppoſed, by parliament, to be the ſpeech of the miniſter. How cruel would it have been on king James's miniſters, ſays Mr. Horace Walpole, if that interpretation had prevailed in his reign!

Thoſe who adopt the doctrines of indefeaſible right, and abſolute dominion, deceive both their ſovereign and themſelves; and ſanction tyranny by ſpeculative principles, which it is not in human nature to carry into practice. *The judgment and decree of the univerſity of Oxford, paſſed in the convocation, July* 21, 1683, *againſt certain pernicious books and damnable doctrines, deſtructive to the ſacred perſons of princes, their ſtate and government, &c.* was fully contravened, in its moſt eſſential point, by the conduct of her own members at the revolution. The decree was drawn up by Dr. Jane of Chriſt Church, who was afterwards one of the four delegates from the univerſity to offer their plate to the Prince of Orange, when on his march to London: And in 1710,

* See King James's Works. Rapin's Hiſtory, vol. II. p. 178.

it

it was burnt by the common executioner, in obedience to the order of the house of peers.*

When the great Lord Russel was condemned, on account of the Rye-house plot, in 1683, Dr. Tillotson and Dr. Burnet were both anxiously assiduous in their endeavours to persuade his Lordship, that "the christian religion absolutely forbids the "resistance of authority; and that it is not lawful, on any pre-"tence whatsoever, to take up arms against government." The impression they made on the mind of their noble friend may be collected from the following passage in his speech. "For my "part, I cannot deny, but I have been of opinion, that a free "nation, like this, might defend their religion and liberties, "when invaded and taken from them, though under pretence "and colour of law. But some eminent and worthy divines, "who have had the charity to be often with me, and whom I "value and esteem to a very great degree, have offered weighty "reasons to persuade me, that faith and patience are the proper "ways for the preservation of religion, and the method of the "gospel is to suffer persecution, rather than to use resistance. "But, if I have sinned in this, I hope God will not lay it to "my charge, since he knows it was only a sin of ignorance." †

The passages in the New Testament, wherein obedience to magistracy is so emphatically inculcated, are justly supposed to have been particularly addressed to the Gaulanites, a wild and deluded party, the followers of Theudas, a native of Gaulan, in Upper Galilee. This fanatic, in the tenth year of Jesus Christ, "which was the last of Augustus, excited his "countrymen the Galilæans, and many others of the Jews, to "take arms and venture upon all extremities, rather than pay "tribute to the Romans. The principles he infused into his "party were, not only that they were a free nation, and ought "to be in subjection to no other; but that they were the elect of "God, that he alone was their governor, and that, therefore,

* Birch's Life of Tillotson, p. 189.

† Idem, p. 116.

"they

"they ought not to ſubmit to any ordinance of Man. And "though he was unſucceſsful, inſomuch that his party, in their "very firſt attempt, were entirely routed and diſperſed; yet ſo "deeply had he infuſed his own enthuſiaſm into their hearts, "that they never reſted, till, in their own deſtruction, they in-"volved the city and temple." * It muſt be recollected, alſo, that the followers of Jeſus had long a preposſeſſion that the Meſſiah was to enjoy a temporal kingdom and authority; and that, under his dominion, Judea was not only to recover her independency, but even to ſubvert the Roman power. Hence the ſeducing queſtion propoſed to our Saviour, *Is it lawful to pay tribute to Cæſar, or not?* And St. Paul delivers this expreſs injunction, *Render, therefore, unto all their dues: tribute to whom tribute is due; cuſtom, to whom cuſtom; fear, to whom fear; honour, to whom honour.* But, though it be true that *Chriſt's kingdom is not of this world*; that *every ſoul is to be ſubject unto the higher powers*; and that *whoever reſiſteth the power, reſiſteth the ordinance of God*, yet we are, at the ſame time, aſſured, that *rulers are not a terror to good works, but to the evil*; that *they are miniſters of God to us, for good*; and that, *for this cauſe, we pay tribute.* From hence, I think, it is clearly to be inferred, that magiſtracy is the ordinance of God, for the good of ſociety; but that the duty of allegiance is exactly proportionate to its adaption to the great ends of its inſtitution.

It is curious to obſerve how conſonant the law of England, relative to the diſputed titles of our ſovereigns, is to the maxim of the great apoſtle of the Gentiles, *the powers that be are ordained of God.* The eleventh ſtatute of Henry VII. recites, that "the "ſubjects of England are bound, by the duty of their allegiance, "to ſerve their prince and ſovereign lord, *for the time being*, in "defence of him and his realm againſt every rebellion, power, "and might raiſed againſt him. And that whatſoever may "happen in the fortune of war againſt the mind and will of "the prince, *as in this land*, ſome time paſt, it hath been "*ſeen*; it is not reaſonable, but againſt all laws, reaſon, and

* Percy's Key to the New Teſtament.

"good

" good conſcience, that ſuch ſubjects, attending upon ſuch ſer-
" vice, ſhould ſuffer for doing their true duty and ſervice of alle-
" giance." This," ſays Sir Michael Foſter, " putteth the duty of
" the ſubject upon a rational and ſafe bottom. He knoweth that
" protection and allegiance are reciprocal duties.—He ſeeth
" the fountain, from whence the bleſſings of government, liberty,
" peace, and plenty flow to him; and there he payeth his allegi-
" ance." *

Having made the foregoing quotation from the works of this excellent judge, I am tempted to add a few more paſſages, on the ſubject of government, from the ſame invaluable diſcourſe. Some learned men " ſeem not to have ſufficiently
" attended to the nature and ends of civil power, whereof the
" regal dignity is a principal branch. They ſeem to have
" conſidered the crown and regal dignity merely as a DESCEND-
" ABLE PROPERTY; or an eſtate or intereſt veſted in the
" poſſeſſor, for the emolument and grandeur of himſelf and
" heirs, in a regular invariable courſe of deſcent. And there-
" fore, in queſtions touching the ſucceſſion, they conſtantly
" reſort to the ſame narrow rules and maxims of law and juſtice,
" by which queſtions of mere property, the title to a pig-ſtye
" or a lay-ſtall are governed.—If I could conceive of the crown
" as an inheritance of *mere property*, I ſhould be tempted to argue
" in the ſame manner. But had they conſidered the crown and
" royal dignity, as a deſcendable OFFICE, as a TRUST for
" millions, and extending its influence to generations yet un-
" born; had they conſidered it in that light, they would ſoon
" have diſcovered the principle upon which the right of the
" legiſlature to interpoſe in caſes of neceſſity is manifeſtly
" founded. And that is the SALUS POPULI, already men-
" tioned upon a like occaſion." †—" All the rights and powers
" for defence and preſervation belonging to ſociety are nothing
" more than the natural rights and powers of individuals trans-

* See Sir Michael Foſter's Diſcourſes on the Crown Law, Folio, p. 399.

† Id. p. 404.

" ferred

" ferred to and concentering in the body, for the preservation " of the whole. And, from the law of self-preservation, con- " sidered as extending to civil society, resulteth the well-known " maxim *salus populi suprema lex.*

" I think the principles here laid down must be admitted, " unless any one will choose to say, that individuals in a commu- " nity are, in certain cases, under the protection of the primitive " law of self-preservation; but communities, composed of the " same indiduals, are, in the like cases, excluded. Or, that " when the enemy is at the gate, every single soldier may and " ought to stand to his arms, but the *garrison* must surrender at " *discretion.*" *

Note (E) p. 32.

ADVANTAGES OF THE BRITISH GOVERNMENT.

Thomson, whose authority may be quoted, as a moralist and philosopher, has admirably described the British constitution, in the second canto of his Castle of Indolence:

> Whereas the knight had fram'd in Britain land
> A matchless form of glorious government,
> In which the sovereign laws alone command;
> Laws stablish'd by the public free consent,
> Whose majesty is to the sceptre lent.

Under this view of our constitution, loyalty, in a Briton, is a rational and patriotic principle. It is not a blind and servile attachment to the person or family of the monarch; but a reverence for him, as the minister of law and justice, and the patriarch of his people. If, however, his private and public virtues happily merit confidence and esteem, subjection will be accompanied with cordial satisfaction; and obedience performed

* Id. p. 382, 383.

with

with promptitude, zeal, and love. This warmth of loyalty ought to be peculiarly encouraged in a free ſtate; becauſe it may often be found neceſſary to counteract the inſidious arts of faction, or the enterprizing ſpirit of ariſtocratic ambition.

It is a common obſervation, adopted even by ſome republican writers, that an abſolute monarchy is the beſt of all forms of government, provided a ſucceſſion of wiſe, virtuous, and patriotic ſovereigns be inſured. But, admitting the ſuppoſition, however improbable it may be, I am perſuaded it is eſſential to the higheſt inrereſts of the people, that they poſſeſs a ſhare in the adminiſtration; and that the calm of deſpotiſm, even under a Titus or an Antoninus, would be leſs favourable to moral and intellectual improvement, than the agitations which occaſionally ariſe in our mixed ſyſtem of polity. Theſe agitations diffuſe the love of our country, kindle the ardour of ambition, animate the ſpirit of enterprize, and call forth into public exertion many talents, which might otherwiſe have remained in obſcurity.

> This is true liberty, when free-born men,
> Having to adviſe the public, may ſpeak free;
> Which he who can and will, deſerves high praiſe,
> Who neither can nor will may hold his peace:
> What can be juſter in a ſtate than this!*

Theſe high and important privileges inſpire a veneration for the dignity of the human character, and a diſdain of whatever tends to the degradation of our ſpecies. And the enthuſiaſm of liberty, thus rouſed, extends itſelf beyond our country: We learn to regard ourſelves as citizens of the world, and become aſſertors of the equal and unalienable rights of all mankind.

It is to the influence of this magnanimous principle, that we may reaſonably aſcribe the noble efforts, which have been lately made, towards accompliſhing the abolition of ſlavery and the African ſlave trade. "A Slave, or a Negro," ſays Judge Blackſtone, "the moment he lands in England, falls under the

* Milton, Motto to the Areopagitica; tranſlated from Euripides.

"protection

" protection of the laws; and, ſo far, becomes a freeman — This " ſpirit of liberty is rooted even in our very ſoil."* But I truſt, it is not to be *locally* circumſcribed; that it is deeply implanted in our minds; and that, according to the aſſertion of Forteſcue, *Angliæ jura*, IN OMNI CASU, *libertati dant favorem*.† In the caſe of Somerſet, the negro, decided in 1772, it was the judgment of the court of king's bench, that the maſter could not recover his power over his ſervant, by ſending him abroad, at pleaſure. And the chief court of juſticiary in Scotland, in 1778, made an award againſt John Wedderburn, in favour of Joſeph Knight, an African, " that the dominion aſſumed over this negro, under " the law of Jamaica, BEING UNJUST, could not be ſupported, " in this country, to *any* extent: that, therefore, the defender " had no right to the negro's ſervice, for any ſpace of time; " nor to ſend him out of the country againſt his conſent."‡ So explicit a condemnation of the ſervitude of the negroes, by very high legal authority, clearly implies a condemnation, equally ſtrong, of that infamous traffic from which it originates; excluſively of every conſideration, relative to the barbarity with which it is conducted.

From the report of the lords of the committee of council, concerning the preſent ſtate of the trade to Africa, and particularly the trade in ſlaves, it appears that this traffic is frequently carried on by *kidnapping*, and bears a cloſe analogy to *piracy*. The former is defined by Judge Blackſtone, " the " forcible abduction, or ſtealing away of man, woman, or child, " from their own country; and ſelling them into another." By the Jewiſh law, this was a capital offence: *He that ſtealeth a man, and ſelleth him, or if he be found in his hand, ſhall ſurely be put to death*, Exodus xxi. 16. By the civil law, alſo, the crime termed *Plagium* was capital, which conſiſted in ſpiriting away,

* Comment. book I. chap. 1. p. 12.

† De laud. leg. Ang. c. p. 42. One nation there is in the world that has, for the direct end of its conſtitution, political liberty. Monteſquieu's Spirit of Laws. vol. I. p. 215.

‡ Millar on the Origin of Ranks, edit. third, p. 361.

and

and ſtealing men and children.* Piracy is an offence againſt the univerſal law of ſociety; a pirate being, according to Sir Edward Coke, *hoſtis humani generis*. And, by ſtatute 8 Geo. I. the trading with known pirates, or furniſhing them with ſtores or ammunition is deemed piracy; and all acceſſories to piracy are declared to be principal pirates, and felons without benefit of clergy.† Surely the crime of piracy, in its eſſence and degree, is the ſame, to an enlightened mind, on the coaſts of Africa, as on thoſe of Europe: And we condemn, with as full conviction of their enormity, the depredations of the knights of Malta on the peaſants, fiſhermen, and ſailors of Barbary, as we do thoſe of the Corſairs of Tunis, and Algiers, on the ſtate of Italy.‡

Servitude is founded, by thoſe civilians who deem it lawful, on voluntary compact; on captivity; on debt; and on the power of the magiſtrate in the puniſhment of crimes.

Slavery, founded on *voluntary compact*, muſt in itſelf be void; becauſe man, being an accountable creature, has not in himſelf

* Blackſtone's Comment. book IV. chap. 15.

The extent of this crime, as practiſed on the coaſt of Guinea, overpowers the ſenſe of its enormity, and of the miſeries produced by it. Of theſe miſeries we may form an eſtimate, by the following affecting account of the ſufferings of a few natives of another part of the globe, on being forced away from their country, their families, and friends. Chriſtiern IV. king of Denmark, ſent three ſhips to make diſcoveries on the coaſt of Greenland. The commanders of theſe veſſels carried off ſeveral of the natives, who, when firſt captured, "rent the air with their "cries and lamentations. They leaped into the ſea; and when taken "again on ſhip-board, for ſome time refuſed all ſuſtenance. Their eyes "were continually turned towards their dear country, and their faces "always bathed in tears. Even the countenance of his Daniſh majeſty, "and the careſſes of the court and people could not alleviate their grief. "One of them was perceived to ſhed tears always when he ſaw an infant "in the mother's arms; a circumſtance from whence it was naturally "concluded, that he had left his wife with a young child in Greenland." See Encyclop. Britan. Art. Greenland.

† Blackſtone's Comment. book IV. chap. 5.

‡ Howard on Lazarettos, p. 58.

a right

a right to diſpenſe with that accountableneſs, or to yield up his will and conduct to the abſolute diſpoſal of another. Beſides, every compact implies reciprocal and proportionate benefit. But what benefit can he derive from an act, which diveſts him of all the capacities for property, all the rights of a citizen, and all the honourable diſtinctions of a rational being? *Captivity* cannot itſelf be juſtified, except as the conſequence of *lawful* war. And the priſoners, though they may properly be compelled to work for their own maintenance, or, perhaps, in ſome ſpecial inſtances, to make compenſation for damages ſuſtained, owe no farther ſervices to their captors; and have a natural right to be reſtored to liberty, when ſuch obligation has been fulfilled, or whenever there ſhall be a ceſſation of war. In the caſe of *debt*, alſo, the claim to ſervitude is limited, extending only to the retribution of the creditor; and never involving in it any right over poſterity. As a *puniſhment* for crimes, ſlavery may ſometimes be deemed both reaſonable and politic; but, in its duration and ſeverity, it muſt be exactly proportionate to the offence: And, as moſt puniſhments are intended for reformation, no leſs than for example, the benefit of the ſlave and of the public is to be the ſole ſtandard of its meaſure. How little applicable are theſe canons to the juſtification of ſlavery, as it formerly ſubſiſted in Europe; or to the practice of tranſporting ſlaves from the coaſt of Africa to our colonial poſſeſſions!—But the authority of the holy ſcriptures is pleaded. To the Jewiſh laws and cuſtoms we owe no obedience; and the evangelical code will aſſuredly be found repugnant to ſlavery, in its doctrines, its precepts, and the example of its divine founder. We are therein taught, that all mankind are equally the children of one common Father, redeemed by the ſame Saviour, and joint heirs of glory and immortality. We are commanded *to love our neighbours as ourſelves*; and *to do unto others, as we would they ſhould do unto us*. And our divine maſter was himſelf *meek and lowly in ſpirit, condeſcending to men of low eſtate*, and *continually going about to do good*. Converted ſervants, indeed, *under the yoke*, are enjoined *to count their own maſters worthy of all honour*. This, however, can only mean all reaſonable honour: And the *believ-*

ing masters are, at the same time, instructed *not to despise their servants, because they are brethren; but, rather, to do them services, because they are faithful and beloved partakers of the benefit.* 1 Tim. vi. 1, 2. Several of the injunctions of scripture, regarding submission, are to be considered as *prudential*, not as *moral* precepts. *If a man smite thee on the right cheek, turn to him the left also. And, if any man take thy cloak, let him have thy coat also.* Such a rule could relate only to the particular circumstances and situation of those, to whom it was delivered. And the command to bear injury, oppression, or injustice can, in no instance, give a sanction to the commission of those crimes.

St. Paul addresses an epistle to Philemon, a native of Colosse in Phrygia, in behalf of Onesimus, his slave; who had robbed and run away from him, but was, afterwards, converted to the Christian faith, at Rome. The Apostle says, *I beseech thee for my son Onesimus, whom I have sent again: Thou, therefore, receive him that is my own bowels, not now as a servant, but above a servant, a brother beloved, specially to me; but how much more unto thee in the flesh and in the Lord!** Servitude, under such circumstances, is *virtually* annihilated. And it was by the spirit of meekness and brotherly love, that christianity was adapted to promote a gradual abolition of the cruel bondage, in which more than two thirds of the Roman empire were held, at the time of its promulgation.

Note (F) see page 24.

TAXES ON THE NECESSARIES OF LIFE.

At Tobolski, in Siberia, the price of provisions is so extremely low, that it seems to encourage both idleness and debauchery in

* It has been conjectured, that Onesimus received his freedom, and was afterwards bishop of Berœa in Macedonia. "When *Ignatius* wrote "his epistle to the Ephesians, about the year 107, their bishop's name was "*Onesimus*; and *Grotius* thought him to be the same, for whom *Paul* in-"terceded with *Philemon*." Lardner's History of the Apostles. Bishop Watson's Theological Tracts, vol. II. p. 297.

the

the inhabitants; for the labour of one day furniſhes ſufficient ſupport for a whole week, and every additional exertion ſupplies the means of riot and exceſs.* Sir William Temple, in his compariſon between the people of Ireland and the Netherlands, aſcribes the lazineſs of the former to the like cauſe. "For "men," ſays he, "naturally prefer eaſe before labour, and "will not take pains if they can live idle; though, when by ne- "ceſſity they have been inured to it, they cannot leave it, "being grown a cuſtom neceſſary to their health and very enter- "tainment."† But in Siberia and in Ireland, the inhabitants having never ſeen or taſted the enjoyments procured by induſtry, and being in a ſtate of oppreſſion, from which they have not the power to free themſelves, they are deſtitute of adequate incitements to exertion: Whereas in the provinces of America, though the price of labour is very high, and the neceſſaries of life ſtill more cheap and plentiful than in the countries above-mentioned, induſtry ſubſiſts in its full energy. The evils, flowing from high wages and the cheapneſs of proviſions, are chiefly obſerved in our great manufacturing towns, and in the diſtricts immediately dependent upon them. In the kingdom at large, ſuch conſequences are not experienced; yet the country working poor are ſuppoſed to conſtitute three fourths of the whole body of labourers: So that the adoption of a maxim, which is juſt and ſalutary with reſpect to the ingenious but profligate inhabitants of towns, may prove injurious to the more ſober, orderly, but leſs active inhabitants of the country; who are alſo the great ſources of population. For it appears, from Mr. Howlet's calculation, that, at Dunmow in Eſſex, two hundred and ſixty poor families have four hundred and ſixty children; whereas one hundred and ſixteen families, of the ranks above them, have only one hundred and twenty children.

* Lord Kaims's Hiſtory of Man. vol. II.

† Account of the Netherlands, chap. VI.

Note (G) ſee page 29.

STATUTES OF EXCISE.

It is the complaint of an enlightened French ſtateſman, M. Turgot, that the eſtabliſhed rule of finance, in all doubtful caſes, is to make the deciſion in favour of the revenue; and that, by the complication of laws, almoſt every caſe is rendered doubtful. M. Necker alſo obſerves that, when the taxes are immoderate, when they even exceed certain limits, exactneſs is augmented in proportion to the difficulty of collection: It becomes neceſſary to give greater authority to the collectors; to be inſenſible to complaints; to venerate the ſcience of finance; and to honour all the profeſſors of it, without diſtinction.

As the finances of the kingdom are now ſaid to be in a flouriſhing ſtate, and as the annual collection of more than fifteen millions bears ſo large a proportion to the whole capital ſtock and income of the community, it may be hoped that the legiſlature will engage in a thorough reviſion of the laws of revenue, with a view, not merely to their productiveneſs, but to their equity and conſiſtency with the rights of the people. Tacitus records the juſtice of an edict of Nero, commanding the prætor of Rome, and ſimilar officers in the provinces, to receive complaints againſt the publicans, and to redreſs the wrongs, committed by them, on the ſpot.* Let us compare this with the conduct of Frederic II. king of Pruſſia, whoſe tax gatherers ſupported the double office of exciſeman and judge; ſo that if a tenant did not pay his aſſeſſment, on the very day appointed, the collector put on the magiſterial robes, and fined the delinquent in double the ſum. †

* Annal. xiii. 51.

† Towers's Life of the King of Pruſſia.

A very

A very judicious writer, on the ſubject of taxes,* remarks "that though vexation is not, ſtrictly ſpeaking, expence, it is "certainly equivalent to the expence, at which every man would "be willing to redeem himſelf from it." This important conſideration pleads ſtrongly for a reviſal of the exciſe laws; by which ſix millions and a half, a ſum equal to two fifths of the whole revenue of the ſtate, are raiſed chiefly from the arts and induſtry of the people. It is ſaid, that the number of informations, tried in one year, amounted nearly to five thouſand; but the actual forfeitures only to ſeven thouſand pounds. A fuller proof can hardly be adduced that frivolous and vexatious ſuits are often inſtituted, even under the preſent juſt and lenient government. What oppreſſion, therefore, may be dreaded from a farther extenſion of an uninterrupted ſyſtem of exciſe, if power and long uſage ſhall hereafter ſilence the public voice againſt it!

Note (H) page 30.

OATHS.

In the edict of the Grand Duke of Tuſcany, for the reform of Criminal Law, of which the benevolent Mr. Howard has favoured me with a copy, it appears that the number of oaths are greatly diminiſhed; and that they are adminiſtered with the utmoſt ſolemnity and reverence. As this tract is not publiſhed, I ſhall tranſcribe the following paragraphs from it.

"In conſequence of the foregoing regulations, inſtead of the warning to declare the truth, which it was for the judge in the proceſs to give the witneſs, previous to his taking his oath, the ſaid officer ſhall repreſent to him, that the laws, both human and divine, make it the duty of every man not to atteſt a falſehood,

* Smith on the Wealth of Nations, book V. chap. II. part II.

nor to declare himſelf ignorant; he is likewiſe to remind him, not only of the importance of that obligation, but alſo that he is liable to be obliged to confirm by oath, at the requeſt either of the accuſed, the plaintiff, or the injured party, whatever he is about to declare, in reply to the ſimple queries that are to be put to him."

"And we order that, in whatever caſe and circumſtance it may be permitted to adminiſter an oath, let it be to whom it will, and on any occaſion whatſoever, the judge or public officer, carrying on the trial, before he adminiſters the ſaid oath, ſhall repreſent, to the perſon, the obligation that accompanies it, explaining to him its meaning and importance; and to the end that it may make a greater impreſſion, we aboliſh the ſimple formality of touching a leaf of the Bible only, inſtead of which the perſon ſhall kneel down, and ſwear before a crucifix. When the perſon, who is about to ſwear, is of a religion different from ours, he ſhall take his oath in the form the moſt reſpected and dreaded by thoſe of his own perſuaſion, the great importance of the undertaking having previouſly been repreſented to him."

Mr. Howard, in his Obſervations on Foreign Priſons, informs us that, in *La Priſon Ordinaire* at Bern, a ſerious exhortation is hung up, concerning the awful nature of an oath, together with the forms of thoſe, which are to be taken. He tranſcribes the one following. "My depoſition, which has now been read to "me, I confirm before the face of God omnipotent, omniſci-"ent, and true, to contain the truth, as I deſire that God may "be my help, at the end of my days." The ſame excellent author ſpeaks, with much approbation, of the mode of adminiſtering oaths in Scotland; and aſſerts that perjury is not frequent in that country. But I know not how to reconcile this obſervation with what Lord Kaims, a late reſpectable judge of the court of ſeſſion, has delivered, in his Looſe Hints on Education. "Cuſtom-houſe oaths," ſays his Lordſhip, "now a days, go for "nothing. Not that the world grows more wicked, but becauſe "no perſon lays any ſtreſs upon them. The duty on French wine "is the ſame in Scotland, and in England. But as we cannot "afford to pay this high duty, the permiſſion, underhand, to pay "Spaniſh

" Spaniſh duty for French wine, is found more beneficial " to the revenue than the rigour of the law. The oath how- " ever muſt be taken, that the wine, we import, is Spaniſh, to " entitle us to the eaſe of the Spaniſh duty. Such oaths, at " firſt, were highly criminal, becauſe directly a fraud againſt " the public; but now, that the oath is only exacted for form's " ſake, without any faith intended to be given or received, it " becomes very little different from ſaying, in the way of " civility, *I am, Sir, your friend, or your obedient ſervant.* And " in fact, we every day ſee merchants, dealing in ſuch oaths, " whom no man ſcruples to rely upon, in the moſt material " affairs."

Such Machiavelian ſentiments, offered by a learned judge, muſt ſurprize and ſhock every well-informed and well-principled mind. But I ſhall make no other comment on them, than that they irrefragably evince the corrupting influence of the preſent multiplication of oaths, on the moral opinions as well as practices of mankind.

Additional Note, page 19, line 16.

TURPITUDE MARKED BY THE GROSS DEFECT OF GOOD PRINCIPLES, &c.

The diſtinction of *poſitive* and *negative* turpitude is of conſiderable importance in ethics. Yet there may ſubſiſt great apathy, or defect of good principle, in a mind virtuous, as to its general conſtitution. The people of Hindoſtan are remarkable for the gentleneſs of their diſpoſitions, the ſoftneſs of their manners, and the force of their attachments in love. Yet they ſeem to be devoid of compaſſion and generoſity. They are ſaid to be unaffected by the diſtreſſes, the dangers, or even the death of a fellow-creature. " An Engliſh Gentleman was ſtanding by a " Hindoo, when a fierce and ravenous tiger leaped from a

" thicket, and carried off a ſcreaming boy, who was the ſon of " one of his neighbours. The Engliſhman expreſſed ſymptoms " of the moſt extreme horror; whilſt the Hindoo remained un- " moved. What! ſaid the former, are you unaffected by ſo " dreadful a ſcene? The great God, replied the other, would " have it ſo." *

* See Annual Regiſter, for 1752, p. 36.

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ERRATA.

Page 27, line 9 from the bottom, for *forbid* read *forbad*.
78, 10 from the bottom, insert the reference to note (R).
80, 14, dele (R).
83, 13, after "revive and" insert "those of."
85, 2 from the bottom insert (X).
160, 14, for *manufactures* read *manufacturers*.
203, 22, for *But the astringency*, &c. read *And the astringency of it, according to my trials, accompanies its colouring matter.*
215, 10 from the bottom, for *compution* read *computation*.
5 from the bottom, for *properties* read *proportion*.
222, last line, after *ideoque* dele *deoque*.
230, lines 6, 7, for *comeom* read *common*.
296, line 6 from the bottom, for *care* read *ease*.
315, 16, for *and in others* read *and others*.
426, 8, for *regard* read *regarded*.
453, 22, for *in quit* read *inquit*, and for *indagundas* read *indagandas*.
497, 8, for *ledas* read *ladas*.
507, 5 from the bottom, dele *if* after *Hence*.
508, lines 3, 4, for *there must be some rise* read *some must rise*.
514, line 5, for εξοχην read εξοχην.
560, 5 from the bottom, for *Desinia* read *Desinat*.
Page 618, line 19 to 22, dele "Owing perhaps to the great quantity of fixed air which becomes disengaged when the latter is dissolved in the stomach by the Gastric Acid.

It is hoped that the authors of the several papers in this volume will excuse these, and some other small typographical errors not noticed, which have been occasioned by the distance of the editors from the press.

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